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TUBERCULOSIS CONSIDERED FROM A SANITARY POLICE AND ALIMENTARY POINT OF VIEW.

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(*Continued from page* 399, *vol. xxix.*)

If it is the abdominal form of Tuberculosis, besides the probabilities derived from the emaciation, diarrhœa, state of the skin and hair, there should be taken into marked consideration a particular kind of intermittent indigestion which disappears only to appear again after the next feed. This indigestion is due to tumefaction of the mesenteric glands.

The diagnosis in such cases being formed rather with the eyes of the mind than those of the body, the veterinary surgeon would do well to avail himself, if possible, of other information. He should attentively examine the udder, and all the points where there is any chance of meeting with tumefied lymphatic glands. A mammary nodule or a hypertrophied gland gives a very valuable diagnostic assurance. M. Guittard, in a work in course of publication, attaches a serious significance to intermittent tympanitis.

If the practitioner is sometimes embarrassed, notwithstanding the presence of the symptoms just enumerated, and the diurnal oscillations of temperature of the rectum, etc., with more reason will he be perplexed when these symptoms exist singly, or when they are more or less marked by concomitant disturbances of a doubtful value. In these difficult cases we may have recourse to *search for the tubercle bacillus*, or, better, to *revelatory inoculations*.

In pulmonary Tuberculosis, Koch's bacillus is frequently found in the bronchial mucus, which may be stained by the Koch-

Ehrlich process, when the characteristic bacillus will be revealed; or the mucus may be inoculated by injection into the subcutaneous tissue of the guinea-pig—an animal eminently fitted for the purpose, by the rapidity with which tuberculisation of the lymphatic glands, spleen, and lungs takes place in it, and which show the virulent micro-organism. I have demonstrated the great value of the guinea-pig as a revelatory animal, and M. Nocard has confirmed my assertions.

MM. Vernueil and Clado have advised inoculation into the peritoneum, in order to hasten the formation of tubercles; but experience has proved that intra-peritoneal injection only hastens the infection by a day or two, and that it may be dispensed with, especially as it may produce death by a cause foreign to Phthisis. Otherwise, it is not necessary to wait until inoculation has produced tuberculisation of the lung in order to arrive at a decision.

The tubercular lesions are propagated in the guinea-pig with an admirable regularity, which I have already commented upon. If the inoculation has been made beneath the skin of the thigh, then the superficial and deep inguinal lymphatic glands, those in the sub-lumbar region, the spleen, a retro-hepatic lymphatic gland, and, lastly, the lungs, are successively invaded by the tubercular process. It is sufficient that the lesions have reached the spleen in order to obtain all the revelatory evidence needed; but usually twenty days must elapse before this point is reached.

I therefore recommend subcutaneous inoculation on the internal aspect of the thigh of two or three guinea-pigs, and to make a *post-mortem* examination of them in twenty days afterwards. With the object of abridging the time required by this procedure, M. Nocard recommends extirpation of the glands near the seat of inoculation, and to seek for the bacilli in their interior by means of scraping, staining, and the microscope.

But all these tests demand that we should have the virulent mucus, and Nocard points out that we can rarely obtain this from the diseased animal, as after coughing the sputa is arrested in the pharynx and is then swallowed. M. Poëls recommends a very small tracheotomy at the base of the neck, and introducing a sponge fixed at the end of a wire, as far as the commencement of the bronchi. But however trifling it may be, this operation is repugnant to the owners, and Nocard proposes to replace it by less offensive measures. The tongue of the animal may be pulled out of the mouth by vigorous traction, so as to induce coughing, and the expectorated mucus can then be collected from the dorsum of the organ; or mucus may be procured by introducing a sponge attached to any convenient handle, into the pharynx of the

suspected animal, and rubbing it against the sides of that cavity. Cagny has also mentioned giving the animal previously some drug which increases the secretion of the respiratory mucous membrane.

If the animal offers traces of mammary Tuberculosis, the milk may be microscopically examined and inoculated; this should be milk from the low stratum of that fluid which has been drawn from the udder twenty-four hours previously, and kept in a conical glass.

If there is a suspicious lymphatic gland, this should be removed and revelatory inoculations made with pulp from the diseased points. Supposing that the disease is exclusively confined to the abdomen, or that it is impossible to procure nasal discharge, mucus, caseous or non-caseous pulp from a superficial gland, then recourse should be had, if the diagnosis is urgent, to the procedure of M. Peuch. Several series of experiments have shown him that the pus from the seton of a tuberculous cow, from the eighth day contains Koch's bacillus. Of ten guinea-pigs inoculated with half a centimetre of pus, three have presented such lesions. Consequently, in cases of suspicion, when all the other resources of art fail, we may insert a seton into the suspected animal, and in eight days inoculate a guinea-pig with the pus.

It is well to inoculate a good number of guinea-pigs, for some may die through the action of the septic microbes which are nearly always found in such pus; such accidents are a serious inconvenience.

I do not doubt for an instant that the proceedings of the Congress will contain some new diagnostic hints, and that the task of the sanitary veterinarian will ultimately become easier; though in admitting that this may not happen, and that our skill may not go beyond the means of diagnosis summed up by M. Lydtin and myself, it is no less incumbent upon us to extend to other countries of Europe the measures taken by the French Government. Bovine Tuberculosis is not the only disease the diagnosis of which is surrounded with difficulties. Glanders is often as embarrassing as Tuberculosis, and for it I have also proposed revelatory inoculation to remove doubts from the mind of the practitioner. Might we not hope to remove Glanders from the list of diseases which are within the purview of sanitary police?

It is necessary, as Lydtin remarks, to examine the question of Tuberculosis with as much deliberation as that of Glanders, and in a few years everyone will become accustomed to measures which to-day startle and alarm many. Besides, it is not judicious to act in a ferocious manner with Tuberculosis. The veterinary surgeon should deal prudently and discerningly with it, and when

the case appears to him to be above the present resources of his art, he should abstain from interference, and not lightly compromise his reputation and the authority of the law.

As a consequence, I propose to the International Congress to decide as follows :—

1. Everywhere, Tuberculosis should be classed with the contagious diseases dealt with by sanitary police.

2. Tuberculous animals should be killed and their flesh excluded from consumption as food.

3. Pecuniary compensation should be awarded the owners, provided that the animals had not been the subjects of commercial negotiations for a year.*

Chauveau having demonstrated that the ox which ingests the phthisical lesions of man, including caseous Pneumonia, will contract a disease similar to Tuberculosis, we implicitly admit the identity of human and bovine Tuberculosis, and the possibility of the transmission of human Phthisis to the ox by ingestion ; and, in fact, there are some instances which are very much in favour of this opinion. Therefore, it is necessary to protect our own species from the dangers they may incur from the alimentary use of the milk and flesh of tuberculous bovines. We have been a little preoccupied everywhere with preservative measures, but the diverse solutions which have been proposed have thrown minds and acts into confusion, which the present Congress may dispel.

A. The Flesh.

A certain divergence of views as to the noxiousness of the flesh of tuberculous animals, and a strong prepossession in favour of the agricultural interests, have produced the confusion mentioned above. A glance at the history of the question will enlighten us as to its causes.

Historical Notice.—No one now doubts the transmission of Tuberculosis by inoculation and the ingestion of tuberculous products. It is universally admitted that if tuberculous organs are eaten raw, and even cooked (for cooking does not always destroy the virulence), there will be much danger of contracting the disease. But many people think that, apart from the tuberculous

* If the Congress thinks that it would be impossible to grant compensation, I would propose, instead of the second conclusion, Article 10 of the decree of July 28th, 1888, issued by the Minister of Agriculture with regard to Tuberculosis on French territory, as follows: "Every animal recognised as tuberculous shall be isolated and sequestrated, and shall not be moved except to be slaughtered. Slaughter shall take place under the surveillance of the sanitary veterinarian, who shall make an autopsy, and forward a report within five days afterwards."

organs, the flesh—and particularly the cooked flesh—may be eaten almost with impunity. Therefore why withdraw from consumption a very considerable quantity of flesh, and impose upon agriculture, already so much burdened, a serious loss, without any advantage to elementary hygiene?

Others, again, believe that the flesh is only dangerous in certain cases. Gerlach thought these cases occurred when "the disease, starting from a limited tubercular centre, is more or less generalised in the organism;" that is to say, when there exist tubercular lesions in the lymphatic glands adjacent to phthisical organs; when the presence of caseous centres, notably in the lungs, indicates that disintegration is going on in them; when there is a secondary extension of tubercles; and when emaciation is evident. Johne is of opinion that the flesh is only dangerous when the Tuberculosis is generalised, the tubercular substance having extended beyond the lymphatic system of the diseased viscera to the thoracic duct and the blood-vessels. Beyond these circumstances, Gerlach and Johne advise the rejection of the organs offering tubercular lesions, and the consumption of the remainder of the carcase. As a consequence, there have been inaugurated three different jurisprudences with regard to the carcases of tuberculous cattle slaughtered for food:—

1. That which allows the flesh to be passed for consumption, always with the reservation that it should be well cooked before it is eaten.

2. That of partial seizure.

3. That of total seizure in cases in which the Tuberculosis is generalised or accompanied by wasting.

At the Brussels Congress, Lydtin, relying on the opinions of Gerlach and Johne, proposed the third jurisprudence, and presented his motion in the following terms: "In order that the flesh and viscera of a tuberculous animal may be allowed for food, it is necessary that at the moment of slaughter the disease should only be at its commencement, that the lesions should only exist in a small portion of the body, that the lymphatic glands be exempt from all morbid lesions of Tuberculosis, that the tubercular centres have not yet undergone softening, that the flesh presents the characters of first-class meat, and that the general state of nutrition of the animal leaves nothing to be desired at the time of slaughter."

But at the end of the sitting, when this motion was discussed, H. Bouley, under the influence of the well-founded fears engendered by some of M. Toussaint's experiments, induced the Congress to declare that in principle the whole of the carcase should be seized in all cases of Tuberculosis, no matter what may be the extent of

the lesions and apparent quality of the flesh. It may be added that Bouley's amendment was only adopted by 15 votes against 14, there being 9 abstentions; in reality, the question was adjourned. But it was taken up again by the French veterinarians on November 1st, 1885. Notwithstanding a very animated discussion, in which M. Butel insisted upon the adoption of Bouley's proposal, the Congress adopted a resolution little different from that of Lydtin at Brussels.

The Congress assembled at Paris in July, 1888, for the study of Tuberculosis in man and animals, and which was initiated by our distinguished *confrère* M. Butel, placed at the head of its work the dangers attending the use of the flesh and milk of tuberculous animals. Some interesting communications were made, some having for their object the alleviation of the apprehensions inspired by the use of the flesh of tuberculous cattle, and others intended to show this danger in its true light, as well as the serious responsibility, with regard to humanity, which the sanitarians incurred who refrained from recognising it. After a long discussion, the Congress adopted, with only three dissentients, the following resolution: "There is need to carry out by every possible means, including compensation to those concerned, the general application of the principle of seizure and total destruction of all the flesh derived from tuberculous animals, no matter what number of specific lesions may be found in them."

The discussion revealed two peculiarities which it is very important to note. It re-echoed the complaints of several veterinary meat inspectors, who energetically demanded that a simple, clear, and uniform line should be laid down for guidance in the matter; and by the presence of several foreign champions, it terminated by acquiring the authority of an international debate. Bang, of Copenhagen; Thomassen, of Utrecht; Van Hertsen and Degive, of Brussels; Siegen, of Luxemburg; Robinson, of Greenock; and Cope, of London, were in favour of the withdrawal of such flesh from consumption. Thomassen remarked that at the Hygienic Congress at the Hague, in August, 1884, the absolute interdiction of the milk and flesh of tuberculous animals was insisted upon. At the same time the *Journal Officiel* of the French Republic published the decree of July 28th, 1888, adding Tuberculosis to the list of contagious maladies, and an Order of the Minister of Agriculture prescribed the measures to be adopted with regard to the flesh of tuberculous animals. The following are the measures:—

"The flesh from tuberculous animals shall be excluded from consumption—(1) if the lesions are generalised, that is to say not confined exclusively to the visceral organs and their lymphatic glands; (2) if the lesions, though localised, have invaded the greater

part of a viscus, or are marked by an eruption on the walls of the thoracic or abdominal cavity. This flesh excluded from consumption, as well as the tuberculous viscera, must not be used as food for animals, but shall be destroyed. The skin can only be utilised, after disinfection."

We know, on the other hand, that analogous, and even more severe measures, have been specially adopted at the Berlin abattoirs; and that a regulation has been submitted to the Superior Council of Hygiene of the Kingdom of Italy to the following effect: "The flesh of animals sacrificed during disease, principally the flesh of those in a state of emaciation, shall be absolutely eliminated from consumption, not only for mankind, but also for dogs and pigs."

We shall examine these different measures, and ask if they will give complete satisfaction, in form and in substance, to those who are chiefly occupied with the hygiene of man.

Noxiousness of Tuberculous Flesh.—Let us first clearly establish the noxiousness of flesh from tuberculous animals. This has been demonstrated by two kinds of experiments—(1) the ingestion of such flesh, which had every semblance of health; (2) the inoculation of the juice of such flesh.

Of the first we content ourselves with noticing a few. Those of Gerlach and Johne are the most important. Of thirty-five animals fed by Gerlach with the raw flesh of phthisical cattle, 8 (22·5 per cent.) became tuberculous; and of forty-five fed in the same manner by Johne, 13·1 per cent. contracted Tuberculosis.

Peuch gave five kilogrammes of raw flesh without bone to two young pigs in ten days. At the end of two and three months these creatures presented discrete glandular Tuberculosis.

Nocard fed eleven cats with a certain quantity of flesh from tuberculous animals for from two to four days without result; but these negative experiments do not nullify the preceding.

Thus the passage of suspected flesh through the digestive canal may communicate Tuberculosis. Straus and Wartz have demonstrated by experiments *in vitro*, that the virulence of Koch's bacilli is with difficulty diminished hy the gastric juice.

The cooking to which the flesh is submitted may attenuate the dangers, but it is impossible to reckon on it for the destruction of its virulence. In fact, to obtain this result it is necessary that all the virulent portions should be subjected to a temperature of more than 158° Fahr. for half an hour. But in practice this temperature cannot always be uniformly attained throughout the mass of large pieces of meat undergoing cooking. It may be added, in order to be completely informed as to the part played by cooking, that in sixty-two experiments in which Johne had fed animals with flesh

undoubtedly tuberculous, but which had been subjected to boiling in water for from ten to fifteen minutes, 35·5 per cent. of them were infected.

The inoculation experiments with the juice of flesh in which, it may be said, the virus was forced into the organism may appear to some people a little artificial. Nevertheless, the results they furnish are less disturbing than those in which the suspected flesh has been introduced naturally into the digestive organs. Sometimes the results were even almost reassuring.

Thus, Nocard only obtained one instance of infection in a series of twenty-one inoculations made with the juice of the flesh of twenty-one cows seized in the slaughter-houses. But it must not be forgotten that the virulent bacilli are distributed very irregularly in the muscular mass, that they are rare in it, and that, consequently, they may often be absent in the small quantity of juice required for the inoculation of an animal. In order to appreciate the virulence of flesh-juice by inoculation, it would be necessary to examine in a statistical manner the greatest possible number of experiments.

At the Congress for the study of Tuberculosis last year the experiments of Nocard, Chauveau and Arloing, Galtier, Peuch, and Veyssière were cited. These experiments were forty-seven in number, and nine of them resulted in tuberculisation; 137 animals were employed, of which thirteen became tuberculous, which gives a *quantum* for infection by inoculation of 9·4 per cent., while the average in the experiments of Gerlach and Johne, by natural ingestion, was 17·8 per cent.

The two series of experiments, then, converge towards the same demonstration, the noxiousness of the flesh of tuberculous animals; while they indicate, in addition, a fact which is particularly grave from our point of view, that infection through the digestive organs occurs with alarming frequency.

We may calculate the number of bacilli contained in the muscular mass of a tuberculous ox. Taking the above-mentioned experiments into consideration, and supposing that the bacilli are uniformly disseminated throughout the flesh; admit also that each of the 137 animals inoculated received one cubic centimetre of juice; then, if in these 137 cubic centimetres there were at least thirteen bacilli, there would be for each centimetre $\frac{13}{137} = 0{\cdot}094$. We are assured that 100 grammes of flesh yield under pressure 30 cubic centimetres of juice, consequently 100 grammes of flesh contain $0{\cdot}094 \times 30 = 2$ bacilli, 820. A kilogramme will contain 28 bacilli. If a medium-sized ox furnishes 280 kilogrammes nett of flesh, its carcase will therefore contain $28 \times 280 = 7{,}840$ bacilli. This number is not insignificant.

Nocard endeavoured to discover how long the bacilli wandering in the muscular tissue might retain their virulency. Having inoculated six two-and-a-half-months'-old rabbits with a cubic centimetre of a cultivation of *non-sporulated* tubercle bacilli, he killed one of them at the end of two days, and the others one after another every twenty-four hours. From each he removed the ilio-spinal muscle, finely divided it, and submitted it to pressure in order to extract the juice. A cubic centimetre of the latter was inoculated into the auricular vein of a similar series of test rabbits. Those inoculated with the flesh juice of the three first rabbits died tuberculous; the others remained healthy.

Nocard, therefore, concluded that the flesh derived from a tuberculous ox may offer some danger for four or five days after death, but after that time—*i.e.*, before the sixth day—the bacilli are destroyed in the muscular tissue.

This investigation, though interesting from a scientific point of view, is scarcely reassuring from a practical standpoint. In the first place, it is generally during the five days after slaughter that the flesh is retailed to the consumers, and the period is even less in summer. And finally, the muscular tissue may destroy non-sporulated bacilli, but does it also destroy the spores which so often occur in the bacilli of tuberculous organs? The question may be put, and answered almost negatively; for otherwise there could be no explanation of the development of some cases of Tuberculosis of muscles which science has recorded.

Several persons have asked if the flesh of animals which exhibited tuberculous lesions, and were at the same time in good condition, is really dangerous. Baillet, of Bordeaux, has insisted upon such animals enjoying sanitary immunity; Van Hertsen believes that fatal consequences would result from such tolerance, for it is not always in well-conditioned animals that the lesions of Tuberculosis are the most discrete, as he has seen in them pulmonary and mesenteric Phthisis in a very advanced stage.

Veyssiere and Humbert are not content with theoretical considerations; they have inoculated two rabbits with a cubic centimetre of flesh juice from a tuberculous cow in very good condition; the rabbits became tuberculous. Consequently, the bacilli of fat cattle are not less dangerous than those of emaciated ones.

It may be added, that the flesh of fat cattle is less likely to be sterilised by cooking than that of others; for it is such flesh which is eaten half raw in preference to lean meat.

In conclusion, the flesh of all tuberculous animals, be they fat or lean, may contain the germs of Phthisis. But do we know the circumstances in which it contains them, and so becomes infective?

Gerlach seemed to know them, for he said that "*the flesh begins to be noxious as soon as it can be demonstrated by persistent traces that the disease, commencing in a limited tuberculous centre, has become spread more or less generally in the organism.*"

Johne also believed he understood them, when he admitted that the flesh is not dangerous "*as long as slaughter cattle affected with Tuberculosis do not show signs of Tubercular Metastasis—that is to say, generalised Tuberculosis.*" Lydtin, in indicating the characters which the flesh and viscera of a phthisical beast should present in order to warrant their being allowed for consumption, shows implicitly the conditions under which the flesh becomes noxious; it is so when the tubercular centre has undergone softening, when the lymphatic glands are involved, or when the lesions have extended over a certain portion of the body.

We also thought that we might define these conditions when we stated, at the Paris Sanitary Congress in 1885, "*that flesh, even when of fine appearance, is always dangerous when the tubercular lesions in a viscus or on a serous membrane have a tendency to become generalised—i.e., have got beyond the lymphatic glands afferent to these parts.*"

The French legislature has also recognised these conditions, for it prescribes the exclusion of flesh from consumption "*if the lesions are generalised—that is, not confined exclusively to the visceral organs and their lymphatic glands; and if the lesions, though localised, have invaded the greater part of a viscus, or are manifested by an eruption on the walls of the chest or of the abdominal cavity.*"

These are so many hazarded pretensions, and this is easily proved by reference to certain notions as to the mode of propagation of the tubercular virus in the organism. Undoubtedly, the muscles can only be dangerous if Koch's bacilli circulate with the blood in their mass, or if they are found in the blood-vessels, at the commencement of infection, as well as in the course of advanced infection. The bacilli do not necessarily wander from their point of entry towards the organs in which they locate themselves, except through the lymphatic channels; or their passage in the lymph is not indispensable to their ulterior fixation. Introduced into the connective tissue, the bacilli are unequally distributed between the blood and the lymph, and pass to the glands, parenchyma, and serous membranes; then they manifest their presence, at first at the points which are most favourable to their stagnation and to the development of the processes which they engender. Tuberculisation of the lung in the rabbit is as easily induced by introducing the virus into the jugular vein as into the subcutaneous connective tissue of the thigh. And as in this animal the lymphatic course pursued by the virus is not

marked out by tubercular lesions, it is impossible to state whether, in a rabbit affected with pulmonary Tuberculosis, the bacilli have been disseminated by the blood or the lymph.

Assuredly, when the virus penetrates by the intestine the lymphatic glands are generally first invaded, then the lesions extend to the serous membranes and to the thoracic cavity. But infection does not invariably proceed in this manner; it may develop simultaneously in the abdomen and the lungs, and in order to gain these organs rapidly it is essential that the virus enter the blood at a very early period.

When the lesions are established and are manifest in a viscus, it is not necessary that they should be either very extensive or softened in order to allow a certain quantity of microbes from them to enter the circulation. The sudden explosion of the majority of cases of tuberculous Meningitis or Peritonitis, coinciding with few and little advanced pulmonary lesions, furnishes evident proof of this assertion.

An animal which has a tuberculous lesion of any kind is continually in danger of generalisation, and there is nothing to show, when it is slaughtered by the butcher, that the capillaries of its muscles may not be traversed by bacilli in quest of a propitious site for their multiplication.

The distinction between a localised and a generalised Tuberculosis is very difficult to make. We find the indication of a generalisation in the presence of glandular lesions beyond the lymphatic system of the tuberculised organ. Thorot, of Troyes, however, has found these lesions along with a very discrete tuberculisation of the viscera; and he mentions having found alteration in the gland of the first intercostal space (the inspector's gland of Van Hertsen); while tubercles were very rare on the parietal pleura, or, if absent there, were observed on the lungs in more or less large quantity. He has made analogous remarks with regard to abdominal Tuberculosis, and he recommends "inspectors of abattoirs to minutely examine the pectoral and abdominal lymphatic glands of all carcases of animals brought in pieces without viscera, *even when the pectoral and ventral walls, covered by their serous membrane, appear to be completely destitute of tubercles.*" That is, in cases of dissimulated generalised Tuberculosis, careful search should be made to discover local indications. When such search is well done, it will be found, as happened with Veyssière, of Rouen, that really localised Tuberculosis is very rare; for during three years, in eighty-one cases of Tuberculosis, that observer had only met with three in five perfectly characteristic cases. It may be remarked that the other two were perhaps in process of generalisation when they were observed.

A word may be added to these considerations, to the effect that the study of bovine Tuberculosis will perhaps furnish facts that will cause us to look upon this malady with still greater apprehension. Some years ago Toussaint pointed out the virulency of the blood in a case of bovine, and in another instance of human Tuberculosis; and Courmont, prosector at the Lyons Faculty of Medicine, has found in a case of pleural Tuberculosis in an ox, a microbe which appears to have taken the place of Koch's bacillus, and the cultures of which produce simultaneously tubercles and blood infection in the inoculated animals. Courmont is probably in the presence of an analogous case to that found by Toussaint. If such cases were somewhat more frequent, it would then be realised how dangerous the flesh of diseased animals might be.

Measures to be Adopted with regard to Tuberculous Meat.—To sum up, scientific prudence demands that we should look upon as noxious, at all stages and under all conditions, the flesh of animals which exhibit tubercular lesions. No doubt its noxiousness, present or latent, will probably depend upon the extent and the state of softening of these lesions. Precisely speaking, the guarantees given to the consumer by Gerlach, Johne, and by the French law, appear to us insufficient, although since the decree of the 28th July, 1888, the number of seizures has increased in the majority of the abattoirs, notably at Lyons.

Lydtin would permit the use of such flesh "*if the lymphatic glands are still exempt from any morbid lesion.*" But as there may not be, perhaps, tubercular centres in an ox which are not accompanied by hypertrophy of the lymphatics of the affected organ, the licence would in reality cause the seizure of every tuberculous animal. It would be better not to tamper with measures, but pronounce distinctly in favour of seizing all the flesh derived from diseased animals, no matter what the extent or the state of the lesions or the appearance of the flesh may be.* The flesh thus seized should, except the suet, be so treated that it cannot he used as food for animals.

It might be objected, no doubt, that bovine Tuberculosis is not the only source of human Tuberculosis. We know this, and we are even persuaded, unfortunately, that it is the least important source. But that is no reason for heedlessly creating new centres of contagion and predisposition; for I believe that no one attending the Congress would take the responsibility of categorically affirm-

* At the Paris Congress, in 1888, for the Study of Tuberculosis in Man and Animals, Degive and Van Hertsen, of Belgium; Thomassen, of Holland; Robinson and Cope, of England; Siegen, of Luxemburg; Aureggio, Butel, Spillman, Lefebvre, and Arloing, insisted upon the total prohibition of the flesh of tuberculous animals.

ing that in no case the use of Tuberculous flesh is without danger.

Several of our *confrères* have remarked on the frequency of Tuberculosis among the pigs of certain breeders. In the majority of instances, as Veyssière has shown, Tuberculosis of the pig is derived from the ox; and Moule and Peuch have spoken, the one of the frequency of the disease in fowls, the other of its inoculability in rabbits. We know that in important poultry farms it assumes the characters of an enzoöty. It would, therefore, appear necessary to treat the flesh of these creatures like that of tuberculous creatures.

Compensation.—Although Lydtin did not think that the flesh of all tuberculous animals should be prohibited, yet at the Brussels Congress he proposed that compensation should be accorded for all animals seized at the abattoir, and he regarded this measure as an excellent one for preventing the sale of tuberculous animals. *A fortiori*, we ought to propose the principle of compensation when total seizure is made in every case, without distinction. Nearly all the veterinary surgeons who took part in discussions at the Congresses in 1883, 1885, and 1888 considered compensation as the corollary of seizure or interdiction of tuberculous flesh.

An opinion which is of great value in such a case, and which it gives me pleasure to cite, is that of Van Hertsen, who has been for a long time veterinary inspector of the Brussels Abattoir. He says, "Though completely sharing in the opinion of those who counsel the total seizure of all tuberculous flesh, yet it seems to me impossible, notwithstanding the confidence which the communal administration of Brussels reposes in me, to advise such a step if, in order to carry it out, compensation could not be allowed, partially or totally. This is the arm provided by Lydtin to destroy this scourge—bovine Tuberculosis—compensation for killing cattle attacked with, or suspected of being affected with, the disease; and compensation for the expropriation and destruction of tuberculous flesh, because it is dangerous as food."

It is essential to inquire whether compensation should be sanctioned in every case of seizure. Rossignol offered important observations at the Brussels Congress. He established a distinction between an emaciated and sickly-looking cow, in which Tuberculosis might be suspected, and a fat, healthy one in which the disease exists unknown to the seller or buyer. In the second instance he would award compensation, but in the first he would refuse it, as if granted it would encourage dealing in doubtful animals. Such a proposition would reward the honest breeder or feeder, and leave the proprietor responsible for the cattle whose

health indicated internal lesions—animals which would be declared by the sanitary service as suspected of Tuberculosis.

The idea is doubtless an excellent one, but it might be asked if, in practice, it would not encounter great difficulties? On what basis should the distinction between a lean and a fat beast be established? In fatness there are as many gradations as in colour; and it is much to be feared that the decisions of the inspector would often give rise to protestations, and give lots of employment to arbitrators. It would be better if no distinction were made.

In adopting the proposal of Rossignol the charges would not be heavy, for the tuberculous cattle would be in the category of passable or mediocre nine times in ten. At what rate should the indemnity be fixed? Its amount might be calculated according to the real loss imposed upon the owner or butcher through seizure. Lydtin estimates the total value at 34·18 per cent. of the utilisable parts of the carcase (skin, horns, hoofs, and suet), and the loss caused by prohibition of the flesh at 65·22 per cent., the seized portions being about two-thirds the value of the animal.

In such a case, therefore, it appears indispensable to allow compensation equal to two-thirds of the animal's worth. It is equitable, we might almost say it is useful from certain points of view, that the owner should share in the loss; and so we would fix the allowance at one-half of the total value of the animal as it stands. In addition, to avert certain contingencies which might press unduly on the common funds, the maximum amount should be limited to twelve pounds (300 francs).

It might be added that, if the Congress finds a simple and practical means of separating tuberculous animals into two categories, we would willingly accept the opinion of Rossignol, as to excluding speculation in a question in which the public funds are involved.*

B. The Milk.

I may be brief on this point, for I know of no protestation in favour of the milk of tuberculous cows. Nevertheless, before presenting conclusions, I will give a rapid glance at the information we possess as to the noxiousness of this milk.

H. Martin some years ago inoculated guinea-pigs with samples of milk sold for consumption in Paris, and several of these creatures

* The principle of compensation for Tuberculosis is accepted and sustained in a bill presented to the French Chamber by the deputies Camescasse and Ribot, approved and declared urgent by the thirty-third Commission of Parliamentary initiative. In this bill the compensation is fixed at one-half the value of the animal if it is examined while alive, and then killed; at one fourth if it is inspected at the abattoir after slaughter.

became tuberculous. Whence came this infective milk.? From cows suffering from Tubercular Mammitis, would reply Bollinger, Klebs, Conheim, Peuch, and Nocard, who have studied the virulency of such milk. It would seem, then, at first sight, that it would be easy to prevent the use of this unhealthy aliment as food. But Bang, of Copenhagen, has remarked that there may elapse three weeks, and sometimes even a month, between the commencement of Tubercular Mammitis and the moment when the lacteal secretion loses its normal characters, during which time it is impossible to distinguish, clinically, this form of Mammitis from the non-tubercular form; and nevertheless the milk secreted, notwithstanding its healthy appearance, contains Koch's bacilli. The veterinarian, if consulted at this period, would be likely to allow a really dangerous milk to be passed for consumption.

Besides, Bang's attentive observation has permitted him to note that twice in twenty-one instances the milk from cows affected with generalised Tuberculosis was virulent, though the mammæ were quite healthy. If the cows which furnish this infective milk are not declared to the authorities, or if their condition is difficult to diagnose, very dangerous consequences may unwittingly ensue.

The virulence of milk containing Koch's bacillus, as has been proved by Galtier and Bang, is transmitted to the industrial products derived from milk, unless in the process of manufacture these have been submitted to a high temperature.

Bang set himself to determine in a precise manner the temperature necessary to destroy the virulence of the tubercle bacilli found in milk, and discovered that this object was attained when it was subjected to a temperature of 85° Cent. for five minutes. When the temperature did not exceed 75° Cent. the milk was still more or less virulent.

The result of these experiments is that every tuberculous cow should be distrusted; and if certain cows, to all appearance in good health, show alterations in one or more quarters of the udder, it is necessary to be doubly suspicious of them until the nature of the change is ascertained. The altered milk may be examined for bacilli, or clinical inquiry may be made into the previous condition of the udder. If the Mammitis is tubercular, says Bang, we shall learn that tumefaction existed at a period more or less distant from the commencement of the milk alteration. When the diagnosis is made the cow should be considered tuberculous, and sequestrated or slaughtered, as the measures in force may prescribe. With regard to the milk, in whatever condition it may be, its sale and use for mankind should be absolutely interdicted; though it may be used on the spot for feeding animals, after having been boiled for some minutes.

The milk may be dangerous when the udder shows no signs of tuberculisation ; so that all cows should be submitted to an attentive surveillance. Such inspection may be impossible as a general measure, but it might be regularly carried out in all town dairies which are authorised by the Hygienic Council. Lydtin has shown, in his 1885 report, that inspection of dairies can only yield good results when the proprietors are willing to assist the administration; and to ensure this concurrence the administration of the town of Carlsruhe would not authorise the opening of any dairy until they had made a kind of contract with the applicant, by which he agreed to submit to a series of measures or precautions devised with the view of keeping it free from phthisical cows. The following are some of the clauses in the contract :—

"The Local Council of Salubrity is charged with the control of production and sale of milk in the establishment of ——, who on his part engages not to buy any milch cow which does not belong to a breed that usually furnishes good milk ; to only employ cows which have produced from two to six calves, and not to use any older ones ; to exclude from use every cow which loses condition, has the coat harsh and dull, which coughs or has nasal discharge, or which has swellings at the neck, in the prepectoral region, between the thighs, or at the lower part of the breast or belly—tumours which are related to alteration in the lymphatic glands or subcutaneous dropsy ; every day to ascertain the temperature in the rectum of the milch cows, so as to recognise their state of health ; to remove from the dairy, whenever the veterinary surgeon considers it necessary, any cow whose temperature for several successive days differs from the normal standard (38·5° to 39° Cent.), and to pursue the same course with any other cow in which any sign of disease is observed."

Why do not administrative sanitary authorities everywhere adopt similar precautions with regard to dairies ? But whatever may be done, these measures can only have a very restricted influence, and all milk the source of which is not well known should be suspected. The most elementary prudence demands that milk should be always boiled before being consumed.

Conclusions.—The foregoing considerations impose upon me the duty of submitting the following resolutions to the Congress :—

The International Veterinary Congress hereby declares—

(*a*) That it is necessary to eliminate from human and animal consumption the flesh from tuberculous animals, mammals, and birds, whatever may be the degree of Tuberculosis or the apparent qualities of the meat.

(*b*) That the skin and horns may be utilised after disinfection, and also the suet, if need be.

(*c*) That compensation equal to one-half the value of the living animal (bovine or porcine) should be allowed, or—

(*d*) That compensation equal to one-half the value be granted, if it is in good condition, and does not offer signs of Tuberculosis.

(*e*) That the milk of tuberculous cows should not be allowed for human alimentation.

(*f*) That dairies in large towns or their vicinity should be properly inspected.

(*g*) That everything should be done to ensure the boiling of milk derived from unknown sources, before it is consumed.

If the Congress considers it can adopt these propositions, we are convinced that they will usefully serve the interests of public hygiene, and also, notwithstanding appearances, those of agriculture, in every civilised country. We shall always gain in combating, no matter at what cost in money, an enemy so redoubtable as the virus of Tuberculosis.

THE BRAN OR FLOUR ECZEM, OR PITYRIASIS.

BY R. W. BURKE, F.R.C.V.S., A.V.D., ATHLONE.

In this skin affection the epidermis peels off in small, bran-like scales. The disease appears principally on the head and neck, and on the surface of the mane and tail in the horse; but sometimes it spreads all over the body. In cattle, it attacks the whole body and brings on an unhealthy condition of the skin, which appears slightly swollen, is dry, and often discoloured. The animal rubs itself against adjacent objects, owing to some pruritus accompanying the disease, which leads to hyperæmia and thickening of the cuticle in places. There is some amount of serum exuded on the surface of the skin, causing "scurf."

The disease, *Pityriasis versicolor* of the human being, is, according to Dr. Grawitz's statement, related to the *Oidium lactis*, which is an error. [Not alone has the *Oidium lactis* been mistaken for the achorion (*Favus*), and the achorion for the microsporon furfur (*Pityriasis versicolor*), but the latter were, until recently, considered similar to the tricophyton; and it was suggested that "the different forms of Ringworm may be produced by the same fungus with some differences of circumstances or constitution in the patient." But the details and experiments of recent years make it quite clear that they are entirely different, not only in their anatomical features, but also in their mode of growth when cultivated; whilst clinical differences also make it conclusive that the fungi which cause these several forms of skin disease, both in man and the

lower animals, are quite different from that producing Ringworm, and *vice versâ*.]

When the above disease is far advanced, it is sometimes difficult to cure, and when "cured" usually returns.

The treatment consists in, first of all, thoroughly cleaning the skin by washing in soap and water or potash and water; and in old-standing cases, rubbing in some soft soap, to be removed afterwards with warm water. If the skin is irritable, lubricate with sugar of lead ointment, applied with gentle friction. If the skin is at all sore from rubbing or scratching, an astringent lotion should be used on the sore parts. Internal remedies will not be called for except when complications of the disease are present.—*Lehrbuch der Pathologie u. Therapie*, by M. F. Röll.

2. *Mane-and-Neck Eczem.*—This form of skin eruption is very frequent in horses which are kept unclean. Under the mane and along each side of the neck little pustules of the size of a small pea make their appearance, which burst and discharge an adhesive fluid, causing a matting of the hairs. *The disease appears mostly in springtime, and frequently returns after it has been cured.*

The treatment is to clip the hairs, and particularly where the crusts have formed, which should be previously softened and removed in the usual way. The sore parts should be washed in soft soap and water, to which some tar ointment, oil of turpentine, or other caustic agent may be applied.

This disease frequently also makes its appearance on the surface of the tail, from constant rubbing of the latter, causing loss of hair. This is doubtless brought on from uncleanliness. The treatment is frequent washing of the affected skin with soap and water, and applying lime water.—*Lehrbuch der Speciellen Pathologie u. Therapie*, by Dieckerhoff.

3. *Mane-and-Tail Disease of the Horse.*—This disease is found in various stages. In its advanced stage, it is known as *madidans et pustulosum*, which is most frequently found on the hairy parts of the body. When occurring on the crest, it is commonly known as the "mane" or "neck itch;" on the tail, it is called the "tail itch." Less frequently it is seen on the head, when it is termed the "head itch." The hairs are chiefly involved, and are matted together and soon fall off, leaving the condition known as "rat's tail."

Etiology.—The causes are of a local nature. Uncleanliness and improper grooming of parts covered by long hair are the chief causes. These lead to a collection of dirt, lice, ticks, etc. The affection appears chiefly in dirty inns and hotel stables, where the diseases of the skin are neglected, as in Poland, Russia, Tartary, and other places. Conversely, the affection of the skin may follow

as a result of extra rubbing and grooming, and frequent washing with soap, which is afterwards imperfectly removed from the roots of the hair. This leads to a continued irritation and Pityriasis. Frequent wetting of the hair, which creates a maceration of the epidermis and affects normal secretion, is another cause, and which is noticed in the sheep. Inflammatory changes, induced by rubbing, etc., may also produce it (*eczema squamosum*).

Symptoms.—Owing to the long hairs, the disease usually escapes detection in the early stages, it being seldom noticed until, through rubbing, depilation sets in. The changes are then as follows:—The skin surface is raised by a serous, purulent, bloody or a crustaceous covering, on which small vesicles and pustules may be detected. The hairs are glued together by a dirty, greasy substance, deposited in a thick stratum (*plica polonica*). In a later stage, an inflammatory process in the hair-papillæ is established, which destroys the hairs. The latter become thinner and atrophied, and allow more freely of the passage of dirt and filth of all kinds. In parts where the animal can rub or bite itself, it leads to shedding of the hairs. In the last case, it ultimately leads to sclerosis, destruction of the papillæ, and permanent baldness (*rat's tail*). Simultaneously, the skin becomes tougher than normal skin, and assumes a chronic, squamous, eczematous condition.

Course.—The course is usually a protracted one, the disease being difficult to cure.

Treatment.—Next to cleanliness is dryness of the affected skin. In order to keep the parts perfectly dry, the hair should be previously clipped. After carefully washing and drying the diseased parts, apply either tar, ointment, or some astringent powder, as iodoform or caustic lotion.—*Lehrbuch der Speciellen Pathologie und Therapie der Hausthiere, von Friedberger u. Fröhner.*

MECHANICAL TREATMENT OF FOOT LAMENESS.

BY W. S. ADAMS., V.S. (1ST CLASS), A.V.D., REMOUNT DEPOT, OOSSOOR, INDIA.

I HAVE been interested in reading the favourable reports on the mechanical treatment of Lameness from "Sidebones," as suggested by Professor Fred Smith, by sawing through the hoofs at the quarters. I have had no opportunity of testing its value in a case of Sidebone, but the following record is an instance of the completeness of the operation in a case of Lameness from contraction of the hoofs, causing mechanical pressure on the sensitive structures of the feet, which was relieved by the process of sawing through the horny wall.

A mare which I have had in my possession since she was a foal, has alway had contracted feet, which were also unnaturally small; in other respects she is well grown. I have always attributed this want of natural development, as well as the contraction, to the fact that during her youth it was not possible to allow her the necessary freedom. Lately the mare had been going very "short," and at length her action was quite crippled. At times she was decidedly lame on the off-fore foot. At no time have I been able to detect any sign of structural disease. I therefore concluded that the lameness was due to mechanical pressure on the sensitive structures, and I determined to try the effect of the above treatment. As this was my first experience of the process, I was careful to carry it out in all its details, as described by Professor Smith. After the bar-shoes had been put on, the mare was very lame. I allowed her two days' rest, then commenced regular walking exercise, and she daily improved. After fourteen days there was no Lameness, but still short action. I therefore gave the mare another week's walking exercise, at the expiration of which I drove her a short turn of five miles, which she did well and quite free from Lameness. For three months I kept the saw-cuts open to the coronet and continued the bar-shoe, keeping the mare at exercise, and giving her occasionally a drive. She never liked the bar-shoes, and I was glad when I could discontinue them, which I did in the fourth month. When shod with the usual shoes, the complete success of the treatment was shown. I have now had her going with ordinary shoes for the past two or three months, and the improvement in the shape of the feet is very marked; there is no Lameness, the mare is free in movement, fast, and spirited; whereas previously she was quite the reverse, and almost unfit to drive.

CELLULO-CUTANEOUS ERYSIPELAS SUPERVENING ON TRACHEOTOMY.

BY ILES MATTHEWS, F.R.C.V.S., ROYAL HORSE GUARDS.

THE following case seems worthy of record, not only as an example of Adenitis occurring in an aged horse, but also for the somewhat unusual complication that arose after the operation that was performed to avert death from asphyxia:—

A well-bred black gelding, No. 28, D Troop, General No. 14,388, fourteen years old, ten years service, had been steadily losing condition since its return from Aldershot in August, where it sustained a severe sprain of the near shoulder in a charge at the review held before the German Emperor. Its teeth were examined, and various remedial measures adopted, but without

any marked result, until the 12th November, when it was admitted to the infirmary with a hard and adherent swelling in the submaxillary space. The usual treatment by poultices and fomentations, as well as vapour inhalations, was had recourse to. On the following day the tumefaction had extended somewhat, but remained very hard. No serious inconvenience was exhibited until the night visit at 10.30 p.m., when the animal was found with its head in a corner of the box, breathing sterterously and partially unconscious from asphyxia. I at once performed tracheotomy in the middle third of the trachea, inserting a tube, which afforded immediate relief; in half an hour the dyspnœa was entirely gone, and the animal had regained consciousness.

14*th.*—Copious flow of pus from both nostrils; submaxillary tumour slightly increased in size. Breathing tranquil.

15*th.*—Erysipelas has set in around the incision made for the tube. Skin sore, slightly crackling and pitting on pressure. Temperature, $103\frac{1}{5}°$. Pulse, 56.

16*th.*—Erysipelatous swelling has extended evenly on both sides of the neck to the roots of the ears, and is more painful to pressure, while a quantity of sanious pus escapes from the wound. Abscess in submaxillary space gradually maturing. Temperature, 103°. Horse very emaciated in condition.

17*th.*—Pus discharging freely from the nostrils, and of a very fœtid nature. Pulse, 57. Temperature, $103\frac{2}{5}°$. Unable to swallow.

18*th.*—Abscess burst, affording great relief. Tumefaction of the neck less painful, and the sanious discharge lessening. Removed the tracheotomy tube. Pulse, 50. Temperature, $101\frac{2}{5}°$.

19*th.*—Feeding well. Abscess and tube wound well drained and healthy.

Dec. 7.—Discharged. Cured.

Previous History.—The Veterinary History Sheet shows that this animal had never been under treatment for Adenitis; but as a five-year old, or one year after joining, it had an acute attack of Catarrhal Fever, of which a profuse purulent discharge from both nostrils was a prominent symptom, being admitted January 9th, 1880, and discharged 31st *idem.* Treated for contusion, May 13th-24th, 1881; for wound lacerated, May 29th—June 24th, 1884; for wound incised, 12th-19th November, 1888; wound contused, 21st-30th June, 1889; and for sprain muscular, 7th-21st August.

Treatment.—On the appearance of Erysipelas, local fomentations were applied, the tube frequently removed, tape renewed, and superficial wound freely dressed with solution of carbolic acid, and as far as possible excluding cold air. Liquor ammonia

acetalis was given in drinking-water, and nutritive drenches were administered throughout. Frequent carbolised vapour inhalations to head, fomentations and poultices to abscess.

During convalescence, which was short, sulphate of iron and gentian did much good, and the animal rejoined for duty on the 7th instant, in excellent health and condition.

THE OPERATION FOR THE CURE OF "ROARING."

BY R. W. BURKE, F.R.C.V.S., ARMY VETERINARY DEPARTMENT, ATHLONE, IRELAND.

An article by the American practitioners, and Mr. Trigger's remarks in the Veterinary Journal of December last, on the results of the operation for Roaring, led me to examine more particularly two horses that are at present in this station, and which have undergone the operation according to Dr. Fleming's method. The first horse I examined was found to be a roarer, and is distressed when made to undergo severe exertion. The second animal (a mare) I examined carefully in the Riding School, but she could not be made to roar, nor was she in the least exhausted although galloped for several minutes with a rider on her back. Pressure on the left side of the larynx produced no effect; pressure of the entire larynx, preventing respiration, caused the animal to cough, which was free. Her breathing has been somewhat harsh, which I am inclined to attribute to chronic thickening of the respiratory mucous membrane. She has been used for every kind of "spare duties," so as to try the results of the operation. This mare was reported to me as having never really been in proper condition since the operation, and I was asked to suggest a cause, with the view to remedying her "condition," if possible, more particularly as several horses are said to have suffered in this way after the operation. Having examined the lungs of the animal, I am of opinion she is the subject of chronic Broncho-pneumonia of a subacute type, which explains why she has not maintained her condition for some time past.

Loss of condition, I am informed, is one reason why commanding officers have turned their face against the operation. But the explanation seems to me to be a different one, and from a limited experience of the results of the operation, I would conclude—

(*a*) That probably greater attention is required to the after treatment of the wound in many cases.

(*b*) That such improvements be suggested as experience indicates, and as shall guard against the many secondary results of the operation.

There is an operation of removal of the tongue for cancer of that organ in man, which is often followed by septic Pneumonia, when the patient usually dies; or by Pneumonia of a simple type, when recovery is frequently witnessed. Now, because there are so many cases of death registered from the above-named operation for cancer, do doctors discard the value of the operation itself? There is not any operation, however simple, which is not attended with some danger. It seems to me that what we want is to overcome the weak points of our treatment of the wound in many cases following the operation, before we are in a position to form an opinion either for or against the operation. One improvement I would suggest in the line of treatment is free drainage, brought about by india-rubber tubes, catgut, horse-hair, "Gamgee" tissue, sponges, or some other absorbent. To be on the safe side, I would keep in a drain for some days after the operation, in one angle of the wound, and dress antiseptically. We may protect the wound itself with a piece of green silk "protective" or lint, smeared with glycerine of boracic acid, and then dress with "Gamgee" over that.

That the operation itself has nothing to do with the loss of condition noted in many cases, may be gathered from the fact that of the above horses we have examined, the one that has derived the lesser benefit of the two is in *good* condition, although incapable of much severe exertion.

I would therefore suggest the cause of debility, noticed after the operation for the relief of Roaring, to be chronic Pneumonia of a sub-acute type, and not the operation itself.

[This sequel of operation on the larynx for the relief or cure of horses suffering from Roaring cannot be very common; indeed, experience of the operation in England would go to prove that it is so rare as to be perhaps non-existent. Horses sometimes lose condition, to some extent, soon after the operation, but this may be ascribed to the dieting enforced for a week or two. No affection of the lungs has been observed, so far as we can learn, as a result of the measure; and, as a rule, the horses rapidly recover condition. Many instances in proof of this might be adduced, as well as a large number of successful cases quoted; but at present we may limit ourselves to a brief notice of two, which are fair examples of those noted.

A well-bred horse belonging to Lieutenant Norris, Royal Engineers, stationed at Chatham, and which was a very bad roarer, was operated upon in November, 1888, the left vocal cord and arytænoid cartilage being removed. For some time afterwards there was a cough when feeding and at exercise, and in drinking some water

was returned through the nostrils. In the course of time the cough and defective deglutition disappeared, and the horse was put to work. There was then nothing whatever abnormal found in the respiration when severe tests were applied—the "Roaring" and distress had gone; and to show how fit the horse was for exertion, it may be mentioned that he was driven in tandem, in hot weather, from Chatham to Aldershot (about eighty miles) and back at a rapid pace. His owner, writing from Chatham, says, "Driving from here to London he went ten miles an hour, and the same from Aldershot to Hatchford, in Surrey, on my return—the other stages from eight to nine miles." He adds that the horse is "doing his hunting well, and the cold weather has no effect on him."

A valuable hunter, "Haymaker," the property of the Duke of Westminster, was so distressed on exertion, because of Laryngismus Paralyticus, that he could not gallop across a field, and the noise he made was very loud and painful to hear. He was operated upon after the English method, and in due time returned to a paddock at Eaton, near Chester, the seat of his Grace. His condition two months ago was described as "flourishing," and on December 2nd, Colonel Scotland, the Duke's secretary, who, as an old cavalry officer, and having had years of experience among horses since leaving the Army, is well acquainted with this defect, and who had "Haymaker" under observation before he was sent to Woolwich for operation, writes, "We had 'Haymaker' galloped to-day. When he went past me at a rattling gallop I could just hear a slight noise, very slight, and when he was pulled up he breathed quite freely—nothing whatever was perceptible. I had him galloped past me three or four times, and perhaps what I heard was as much the want of condition as anything else."

It may be mentioned that a thoroughbred horse belonging to an officer was such a bad roarer as to be almost useless; since being operated upon he has run second in a public race.

According to recent reports, there are twenty-seven Army horses which were operated upon a considerable time ago, and which are now "performing their work satisfactorily." The majority of these horses have gone through last summer's drills, and have undergone long marches in hot weather. Some are apparently completely cured, while others make a slight rough noise in respiration, but are in no way distressed.

The operation, to be successful, must not only be properly performed, but the after treatment requires the most careful and skilful attention. The results will then be as favourable as in some other veterinary operations.—Ed. *V. J.*]

Editorial.

INFLUENZA.

An epidemic of Influenza, appearing a short time ago in Russia, has spread over nearly the whole of Europe, and is reported to have manifested itself even in the United States of America. The universality and wide extension of the disease have caused much surprise and comment, even alarm. The number of people attacked has been very considerable in some localities, but the large towns and cities have been most severely visited; and those places where people mostly congregate have been specially unfortunate in having the largest number of cases, as is usual when Influenza appears.

The visitation has been a mild one, and the mortality insignificant, when compared with the number of people attacked. The symptoms, so far as they have been described, do not differ much, if at all, from those enumerated in former epidemics, and are those which characterise Catarrhal Fever, accompanied by a very high temperature and corresponding depression of the vital powers.

So far as our information goes, the domesticated animals do not appear to have suffered so much as mankind. In some cities on the Continent, horses are reported to have been affected with Influenza somewhat more than usual; but whether there is any relation between the human and equine malady it would be hazardous to say. What is called Influenza in horses prevails, it might be asserted, enzoötically, in our big towns every winter; but then it might be ascribed to climatic influences. Certain it is that in some years when this febrile affection is very prevalent among horses, Influenza is not observed in our own species, and *vice versâ*. This season, however, in some of the populous cities, a disease which corresponds in many of its features to the old-fashioned horse Influenza has been rife, and though not at all fatal, in some large establishments it has caused much inconvenience.

That human Influenza has often coincided with wide-spread disease of an analogous character among animals, and especially in horses, has been observed from the earliest times, as is amply shown in the two volumes of "Animal Plagues;" but whether this has been a mere coincidence, or whether the same influence has been at work in man and animals, cannot be positively asserted. Horses are by far the most frequent victims of Influenza; indeed, the malady may be said to be unknown among the other creatures; but then they are so differently treated as to be rendered more susceptible to atmospherical vicissitudes than their congeners.

Whether Influenza is of microbic origin is a problem still to be solved. If it is, then it must be contagious or infectious, and for its prevention sanitary measures would, of course, be advantageous.

But speaking from clinical experience of the disease, there can be no

doubt that the heroic medical treatment of fifty years ago would be most inappropriate now. Blood can no longer be abstracted by the gallon from our patients as in the old times; but, on the contrary, the horses have to be carefully nursed and supported until the crisis of the ephemeral fever has been surmounted, and the more the strength is sustained, so the more rapid and satisfactory is the convalescence. Indiscriminate drugging is wasteful alike of life and medicine; and the less the drug shop is patronised, so the less probability is there that Influenza will prove a troublesome disease to the veterinary surgeon and a source of annoyance and loss to horse-owners. Hygienic measures may be brought to bear with great results in these epizoöties.

IMMUNITY PRODUCED BY AN ALBUMOSE ISOLATED FROM ANTHRAX CULTURES.*

BY E. H. HANKIN, B.A.,

Foundation Scholar of St. John's College, Cambridge.

THE following is a brief preliminary account of an investigation which I have recently been engaged upon under the guidance of Professor Koch, at the Hygienic Institute of Berlin. The results appear to have an important bearing on the theory and practice of preventive inoculation.

It is now generally admitted that acquired immunity against a disease is in reality an acquired immunity against a poison. The phenomena of acquired tolerance of the effects of ordinary albumoses, and of snake poison which contains a poisonous albumose, show a closer resemblance to acquired immunity against a disease than is the case with any other poison. These and other facts led me to expect that if it were possible to isolate an albumose from Anthrax cultures, such Anthrax albumose would probably be capable of conferring immunity against the disease. Such an albumose I have now isolated from my culture fluids by ordinary chemical methods, and find that it gives the ordinary reactions for albumoses, and that it is capable of conferring immunity.

In the course of my process of preparation it is precipitated from its solution by addition of a large bulk of absolute alcohol, and well washed in this liquid to free it from ptomaines, since it is known that all such substances are soluble in alcohol. After the addition of alcohol it is filtered off and dried, then it is redissolved, and filtered through a Chamberland's filter. A rough estimate of the percentage of albumose present in the clear solution thus obtained is made colorimetrically, by means of the biuret reaction and a peptone solution of known strength.

In one experiment four rabbits (Nos. 23 to 26) were inoculated subcutaneously with virulent Anthrax spores. No. 26 served as "control," and died in about forty hours. The other three rabbits had the albumose solution injected into the ear-vein at the same time. Nos. 24 and 25 each had about the five-millionth of their body-weight, while No. 23 had only the ten-millionth of its body-weight of albumose. No. 25 died in less than forty-eight hours, but Nos. 23 and 24 survived. Ten days later Professor Koch kindly reinoculated these two rabbits for me with very virulent Anthrax from an Agar-agar culture. Their temperature has remained normal since then, and they are now alive and well a fortnight after this operation.

* From the *British Medical Journal*

I have also succeeded in producing immunity in mice against attenuated Anthrax. Dr. Fränkel kindly gave me an Agar-agar culture of *deuxième vaccin*. From this I made bouillon cultures, and whenever I inoculated a rabbit from these it always died, unless it had at the same time been protected by a dose of the Anthrax albumose. Unfortunately, when, a few days later, I was inoculating mice with these cultures after a dose of Anthrax albumose, I omitted to inoculate a control rabbit; so that although the culture showed itself virulent for my control mice, I have no certainty that it was still virulent for rabbits. The following experiment shows its effects on mice after treatment with Anthrax albumose. Seven mice had each the millionth part of its body-weight of Anthrax albumose injected hypodermically. Three others had each the five-hundred-thousandth of its body-weight. A week later they were all inoculated with *deuxième vaccin*. Two control mice were also inoculated, and of these one died in about thirty-six hours; the other was exceptional, inasmuch as it died only after 108 hours. Only one of the three mice which had the five-hundred-thousandth of its body-weight of albumose survived. Of the seven mice which had been protected by the millionth part of their body-weights of albumose, four died. So that in this experiment, out of ten mice inoculated, only four showed immunity against Anthrax.

In another experiment ten mice were each inoculated with the millionth part of their body-weight of Anthrax albumose and with *deuxième vaccin* at the same time. Of these, three died after 108 to 116 hours; the others survived. Three others had only the two-millionth of their body-weights of Anthrax albumose and *deuxième vaccin*. Two of them are now living. Four control mice were inoculated, and all died.

In my earlier experiments I gave larger doses of Anthrax albumose, and on inoculation with Anthrax the animals died, often before the control animals. For instance, I have had several cases of mice dying twelve to sixteen hours after the inoculation with virulent Anthrax. In the spleen pulp of rabbits and guinea-pigs, however, I almost always found under these conditions numerous phagocytes. In these the bacilli sometimes showed signs of degeneration, but more often appeared to be alive and growing. Sometimes the long chains of bacilli so characteristic of the growth of attenuated Anthrax appeared to be growing out of the cells. In one case (a rabbit which died only 150 hours after inoculation) the only bacilli that I could find in the spleen were contained in phagocytes. I have found these phagocytes in rabbits not only after inoculation with *deuxième vaccin*, but also after virulent Anthrax. In mice I have never found phagocytes, but often after a large dose of albumose and attenuated Anthrax the bacilli in the spleen appeared to be in longer chains than in the control mouse. The appearance of these phagocytes and chains of bacilli led me to try the effect of very minute doses of Anthrax albumose, with the favourable results described above, for the possibility suggested itself that these phenomena were indications of a commencing immunity. In several experiments the animal received the Anthrax only several days after a large dose of albumose; but in these cases also death ensued in a longer or shorter time than usual, according to the quantity of Anthrax albumose injected; while numbers of phagocytes were usually to be seen. Apparently the albumose had remained in the system, or at any rate only a small part of it had been excreted. Beyond this power of conferring immunity with a small dose, or of hastening the course of the disease with a slightly larger dose, this albumose does not show clearly any physiological action in the quantities employed. I often noticed, however, that for a couple of days after larger doses the mice appeared to be sleepier than the control mouse living in the same cage.

Although the following inferences seem capable of explaining the above

results more simply than any other theory, I do not pretend that they are as yet satisfactorily proved; I only wish to assert that my results make it probable that—

1. The Anthrax bacillus owes its power of living in the animal body to its power of producing a poisonous albumose.
2. That this poisonous albumose is capable of suppressing the "germicidal power" of the living animal.
3. That this albumose seems to be very slowly excreted.
4. That if a large dose of this albumose is injected into an animal the entry of Anthrax bacilli into the system is aided.
5. That if a very small dose of this substance is administered tolerance is acquired against its poisonous properties. Consequently, when after a few hours or days the Anthrax virus attempts to suppress the germicidal power of the animal by means of its albumose, it is unable to do so, because the animal has already acquired tolerance of its poisonous quality.
6. With a dose of Anthrax albumose intermediate between that employed in the above two cases death ensues in the usual time or (in other cases) life is greatly prolonged. Apparently in this case complete tolerance of this comparatively large dose of albumose is unattained. Consequently the Anthrax bacilli are able to live and produce more of their albumose, and at length by this means overcome the resisting power of the animal.

My observations have been made on over a hundred mice and about fifty rabbits. My best thanks are due to Professor Koch, and to Drs. Fränkel and Weyl, for their very kind advice and assistance.

RABIES IN FRANCE.

THE Annual Report of the French Minister of Agriculture for 1887, on the contagious diseases of animals during that year, is full of interesting matter with regard to what are usually designated in that country, epizoöties. With regard to Rabies it is perhaps particularly so; and because of the probability of a greater amount of attention being devoted to it in this country than has hitherto been the case, we will here notice what M. Tisserand says about it.

It is stated that during 1887, 2,567 rabid dogs and cats were reported; and also 426 domestic animals, valued at about 100,000 francs (£4,000), died or were destroyed because of the bites from rabid dogs. Not a department was spared; in each of 31 of these there were at least 10 rabid dogs; 17 had more than 10 and less than twenty, 26 had more than 20 and less than 50, 9 had more than 50 and less than 100. These were the Basses-Pyrenees (101 cases), and the Seine (642 cases).

The sanitary police measures are based on three principles—

1. The declaration of cases of Rabies, which alone gives authority to seek for animals which have been bitten by rabid animals.
2. The immediate destruction of all dogs which have been so bitten.
3. The destruction of stray dogs, among which the malady is perpetuated.

Unfortunately, observes M. Tisserand, these measures are not always applied with the severity which such a disease demands. The owners will not declare the malady as long as they can dispense with doing so. There is scarcely one of them who would voluntarily destroy his dog if it were bitten or worried by a rabid dog; and the majority of them would rather shield their dogs from this capital measure, which is the most important of all those which have been devised for dealing with the scourge. And neither do the agents of the authorities bring sufficient energy to bear in executing the sanitary prescriptions. The tribunals themselves also contribute to fetter the action

of the sanitary service by the extreme indulgence they manifest towards the too rare cases in which delinquents are brought before them. In none of the departments is Article 52 of the regulations, which prescribes the slaughter of every dog not provided with a collar bearing the address of its owner, effectively carried out.

These are the reasons why, among this wandering dog population—without master, home, or supervision—Rabies is incessantly revivified; and it is because of this that we every year witness the increase in the number of rabid dogs. The statistics of the department of the Seine are particularly instructive in this respect. In 1883, 182 rabid dogs were reported, in 1884 there were 301; in 1885, 518; in 1886, 604; in 1887, 644; and there were more than 500 during the first quarter of 1888.

But it would be a sovereign injustice to hold the representatives of authority alone responsible for this state of affairs. On the contrary, the heaviest part of the responsibility rests upon the public, who, in consequence of an excessive tenderness manifested towards the canine species, resists the application of measures the most justifiable. They will only allow the authorities to act when some accident alarms them by the circumstances under which it occurs, or when some persons have become victims. Then only is the public moved, and every one calls out for energetic action; but whenever the memory of such occurrences becomes effaced these alarms are forgotten, and then protests are heard against the cruelty inflicted upon dogs by the precautionary measures.

The above figures illustrate the influences of these causes; with 2,567 rabid dogs, only 7,926 dogs bitten or worried by them were destroyed—an average of only 3 bitten to every rabid dog. In the Belfort district, where there were 4 rabid dogs, 24 bitten, or suspected to have been bitten, by them were destroyed; in the Tarn, 423 of the former were killed, with 15 of the latter. But such departments are few in number, and there are some in which the number of suspected dogs killed scarcely exceeds the list of rabid, while in others it is lower. In the Correze, for example, there were reported 21 mad dogs and only 22 bitten by them; in Charente, 3 mad and 2 bitten; in Herault, 67 rabid and 41 bitten; in Tarn-et-Garonne, 23 rabid and 22 bitten; in the Basses Pyrenees, 101 rabid and 160 bitten.

The legislative measures and the regulations are sufficient to ensure the disappearance of the malady in a very few years, if all local and administrative authorities would but consent to submit to them with equal good-will. The reports from the departments of Var and Loiret furnish a startling proof of this, and amply demonstrate that there is no need for new laws. The considerable extension of Rabies which took place in the department of Var in 1884 and 1885 is still remembered. Then the Prefet showed energy, and the result was soon evident. In 1886 in the whole department there were only 6 rabid dogs, in 1887 there were but 4, and it was not certain whether even these were affected, as there were afterwards no rabid animals in the villages through which they passed, though 30 dogs which they had bitten or gone near were killed as suspected. It may, therefore, be affirmed that Rabies was extinguished in this department, which it had terrified for two years.

In Loiret there were 20 cases of Rabies during the first quarter of 1887. The public became alarmed, energetic measures were applied, and with the result that during the month of August there were only 3 new cases, and from that time until the end of the year only one dog was killed.

The number of persons bitten, according to the veterinary reports, was 668 in 1887, and of these 22 died—being one in 30·33 per cent. But according to the statistics of the Pasteur Institute, in 1887 there presented themselves for protective treatment 1,431 French people who had been bitten by mad or suspected dogs; of these, 16 died of Hydrophobia, or 1·11 per cent.

In the department of the Seine it is known that 350 people were bitten by rabid animals. Of this number 306 underwent the antirabic treatment, and of these 2 died of Hydrophobia or 0·76 per cent.; while of the 44 who were not so treated, 7 died of the malady, or 15·90 per cent.

The Consulting Committee on Epizoöties has been frequently occupied with facts relative to the disease, and on several occasions it has expressed its opinion that the legislative measures should be strictly enforced. It has above all insisted that in the department of the Seine the obligation to allow only dogs which are led or muzzled to be in the public streets should be maintained. During the whole of the time that this measure was enforced the number of cases of Rabies progressively diminished, but a recrudescence of the malady took place immediately on the withdrawal of the order for its enforcement. This is a fact which the public, as well as the administration should bear in mind.

"THE CHEMISTRY OF THE URINE OF THE HORSE."*

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I HAVE attempted in the following paper to record the results obtained from a series of analyses of the urine of the horse in health.

When I first commenced my subject I was under the impression that, with the exception of the following references,† the literature of the subject was remarkably bare. It is true that nothing had been done in England, but on the Continent, in Germany in particular, the urine of the horse has received especial consideration. My attention was later called to the following references.‡

My difficulty at starting was to obtain the whole twenty-four hours' urine; for this purpose I constructed a stall with sides which sloped towards the centre; running down the centre was a covered drain, the cover being perforated, and arranged in segments so as to allow of thorough cleaning; this drain led to the rear of the stall, and emptied into a vessel sunk in the ground suitably protected against ingress of foreign material. The entire apparatus was made in cast iron, and protected against rust.

The arrangement was found to give absolute satisfaction.

This plan of collecting the urine is nothing like so complicated as that used by Munk and others in Germany, which consists of a bag into which the penis is placed, the bag being secured by numerous straps around the belly and between the thighs. There are very few English horses which would allow such an apparatus as Munk's to be strapped under the belly. I shall use this appliance to collect the urine from sick animals, for it is likely that these will not object to wear Munk's contrivance.

The horse to be experimented upon was previously weighed, when considered necessary, and was then placed in this stall, and tied up for twenty-four hours; the stall was made very narrow, so that the animal could not

* From the Proceedings of the Royal Society, vol. xlvi.

† "Animal Chemistry" (Liebig); Thomson's "Animal Chemistry" (Fourcroy and Vauquelin); Colin's "Physiologie Comparée" (Boussingault); "Phil. Trans," 1806 (Brande); "Physiological Chemistry" (Lehmann); Simon's "Chemistry."

‡ Salkowski, *Zeitschrift fur Physiologische Chemie*, vol. ix., 1885; Munk, *Archiv fur Anatomie und Physiologie*, "Physiol. Abth.," 1880, Suppl.-Heft; Tereg and Munk, *ibid.*; O. Kellner, "Landwirthschaftliche Jahrbucher," vols. viii. and ix.; Siedamgrotzky and Hoffmeister, "Eléments d' Analyse Chimique"; J. Tereg, "Encyklopadie der gesammten Thierheilkunde und Thierzucht" ("Harn").

possibly shift from his position. To keep the fæces out of the drain, a little clean straw was put down.

One great object I had in view in making these experiments was to ascertain the difference between the urine of work and that of repose. The only way in which I could get approximate results with regard to the former was by working the animal for one or more days, and then collecting the urine for the last twenty-four hours; I always took the precaution of ascertaining in every case the urine of repose after at least two or three days' rest.

The total number of complete analyses made was fifty-four, and these extended over a period of two years; the total number of urines examined was ninety-six. Influence of season, work, diet, sex, age, etc., were most carefully observed. None of my results were calculated until the inquiry was completed; it was then observed that the composition of healthy horses' urine will vary within wide limits, and that even from day to day the same horse will excrete a fluid of very varying composition, though his condition of diet, etc., remains absolutely the same. I am not prepared at present to offer an explanation of this condition, which so seriously affects my tables of mean results as to render them only approximately true.

Physical Characters of the Urine.

Turbidity.—The normal urine is invariably turbid, due to the suspension of the carbonates of lime and magnesia which precipitate themselves in still greater abundance as the urine cools and stands, and undergoes ammoniacal fermentation.

The amount of salts in suspension is in some cases remarkable, the most common being the carbonates of lime and magnesia, which I have in the majority of my analyses estimated separately as suspended lime and magnesia. Boiling the urine by driving off CO_2 precipitates more of the lime salts. In one or two cases after the urine had stood some days, a hard scum, quite crystalline, has formed on its surface; this has consisted of crystals of lime carbonate. Only once in ninety-six observations had I a perfectly clear urine presented for examination, a urine which threw down no deposit on cooling and standing, and was in most of its physical features closely allied to human urine.

Smell.—Perfectly fresh urine has a faint but distinctly ammoniacal smell; the fluid which represents the twenty-four hours' excretion is always powerfully ammoniacal. This latter creates a difficulty with regard to the determination of urea, for it is impossible to say how much of the ammonia is due to changes in the urea, and how much is preformed ammonia. I have always felt this a trouble throughout the work, but will later explain how I have endeavoured to overcome it.

Reaction.—This is always alkaline, sometimes faintly, but in the majority of cases strongly so. The alkalinity shown by test papers is produced by a fixed and by a volatile substance—the volatile is the ammonia, the fixed is probably a salt of potash. It is obvious that the amount of volatile alkalinity present depends greatly upon the time of year, the condition of the urine (those containing most mucus containing most volatile alkalinity), and the length of time which has elapsed before the estimation is made. As remarked in the last paragraph, how much of the volatile alkalinity in urine twenty-fours old is due to preformed ammonia, and how much to the ammonia formed at the expense of the urea, it is difficult to determine; it is probable, however, that the preformed ammonia in urine is given off in twenty-four hours. Calculated as ammonia, the mean volatile alkalinity in twenty-four hours old urine amounts to 7·1016 grams for work and 7·8534 for rest; these amounts I have added on to the urea, as I am convinced from long observation that they are formed from this substance. The fixed

alkalinity expressed in terms of KHO gives a mean of 2·954 grams in urine twenty-four hours old, but in perfectly fresh urine it is equivalent to 4·8856 grams of KHO in twenty-four hours; this latter is probably too high.

Consistence.—A large quantity of mucus in the urine is by no means an uncommon condition; this is particularly the case in mares, the urine being so thick and tenacious (more like linseed oil in consistence) that it takes some hours to get sufficient through the filter for analysis.

The smaller the bulk of fluid excreted, the larger the amount of mucus it contains; it then becomes sticky and difficult to work with, still, it is a perfectly natural condition. In a urine of average consistence I have found 21·9 grams of mucus, and in one very tenacious 31·396 grams in twenty-four hours.

Specific Gravity.—The mean specific density is 1036, the highest registered was 1050 and the lowest 1014. The formulæ of Trapp and Christison will not apply to the urine of the horse. Solids calculated by these give untrustworthy results.

Quantity of Urine.—The mean amount of fluid excreted by working horses is 4,474 c.c. and in animals that rest 4,935 c.c. The largest amount produced in twenty-four hours was 11,300 c.c., and the smallest quantity secreted 2,000 c.c. Neither season, sex, or age produced any effect on the quantity of fluid secreted. In thirteen observations on the same horse, embracing both hot and cold weather, the largest quantities passed, amounting to over 10 litres, were produced during warm summer months. I place, however, no stress on this observation; probably in another series of experiments the results would be reversed.

It is obvious that much of the bulk of fluid secreted will depend upon the quantity consumed. It is notorious that working horses are often stinted in their water. In one very careful experiment, where all the water was measured, it was found that more urine was excreted during the twenty-four hours subsequent to work than was excreted after absolute rest for one week. The water of the twenty-four hours' urine equals $\frac{1}{5}$ to $\frac{1}{6}$ of the water drunk.

Chemical Characters of the Urine.

Total Solids.—The mean amount of solids excreted by horses at rest was 230·0713 grams; of these the combustible solids are represented by 146·1649 and the ash by 83·9064 grams. The total solids of work are 232·157 grams, the organic solids 152·190 grams, and the ash 79·967 grams. Great variation both at rest and work is observed in the total solids, even where the diet remains the same.

The nature of the diet, according to Tereg,* considerably influences the amount of the urinary solids excreted, as shown in the following table:—

Daily ration.			Solids in the urine grams.
Hay.	Oats.	Wheat straw.	
8 kilos.	2 kilos.		566·6
7 „	2 „	1 kilo.	529·4
6 „	4 „		511·8
4 „	4 „	2 kilos.	477·0
4 „	6 „		460·7
1 „	6 „	2·6 „	346·1

About 90 per cent. of the ash is soluble in water, and 10 per cent. soluble in acid. In the watery solution of ash we find the chlorides of sodium and

* "Encyklopädie der Gesammten Thierheilkunde," vol. iv.

potassium, traces of lime, phosphates, magnesia, and sulphates. In the acid solution lime, magnesia, and sulphates predominate. On looking at the inorganic solids, they are smaller than I had expected; the extreme difficulty experienced in incinerating urinary solids causes, undoubtedly, a loss by the volatilisation of the chlorides, etc.

Urea.—In calculating the urea we have also to take into consideration the carbonate of ammonia, which unavoidably forms during the twenty-four hours the urine is being collected.

To show how much of the urea breaks up owing to fermentation, I have calculated it separately in the table, and then added the two together. I used Liebig's method of determination for some time, but it gives too high results.

My most trustworthy observations have been made with the hypobromite process.

The influence of rest and work over the production has been most carefully studied.

I originally held the view that more urea was excreted during work than during rest, and a long series of analyses supported this view. I found, in fact, in tabulating my results that the resting horses excreted on an average 88·41 grams of urea daily, of which 13·778 grams were in the form of ammonia carbonate; whilst working horses excreted 134·9291 grams, of which 12·4591 grams existed as ammonia carbonate.

The incorrect conclusions which appeared forced on me were due to the fact that the excretion of urea, even on a fixed and rigid diet, is extremely variable, and in the horses from which the above results were obtained I failed to keep any of them long enough under observation to find out this point of variability.

Again, diet influences the production, as proved by the work of Tereg, Munk, and others, who have shown that on a hay diet more nitrogen is excreted than on one containing oats as well as hay; this seems so opposed to what one would expect that I overlooked the point entirely.

Tereg and Munk put down the amount of urea as 120 grams excreted daily in a horse weighing 400 kilos., the diet being oats (4·5 kilos.) and hay (2·5 kilos.). The mean of my own observations is 111 grams; but urea varies much, even on a fixed diet, in different horses; in Tereg and Munk's experiments it varied from 81·5 to 149·5 grams in twenty-four hours.

I experimented on a pony weighing 5 cwt. 21 lbs.; the experiments lasted from 2nd February to 29th March, and were divided into periods of rest and work; the diet throughout remained the same, viz., hay, 7 lbs., oats, 5 lbs.

In the first series of rest and work I found that the animal excreted, on an average, for the resting days 63·63 grams urea, and for the working days 72·913 grams.

In the second series of rest and work, all conditions remaining the same, I found more urea during the resting than during the working period, viz., for rest, 65·125 grams, and for work, 43·33 grams.

Urine of Rest.

	Total nitrogen.	Urea.
2nd February.....	28·56 grams.	60·0 grams.
4th "	35·20 "	62·5 "
6th "	32·00 "	68·4 "

The animal was now worked from the 7th until the 15th February, and again worked on the 17th, and also on the 19th.

Urine of Work.

	Total nitrogen.	Urea.
16th February.....	32·48 grams.	63·0 grams.
18th „	47·71 „	81·37 „
20th „	42·63 „	74·37 „

Complete rest was now given until the 23rd February, when the experiments were repeated.

(*To be continued.*)

VETERINARY MEDICINE IN FRANCE IN THE LAST CENTURY.

In that very interesting work, "Travels in France by Arthur Young during the years 1787, 1788, 1789," a new edition of which has just been published, we find a reference to the Alfort Veterinary School, which shows the estimation in which that celebrated agricultural writer held veterinary medicine, and the favour with which he looked upon the efforts made by the French people to promote it in every way. On the 19th of October, 1787, he writes: "To Charenton, near Paris, to see l'Ecole Vétérinaire and the farm of the Royal Society of Agriculture. Mons. Chabert, the director-general, received us with the most attentive politeness. Mons. Flandrin, his assistant and son-in-law, I had the pleasure of knowing in Suffolk. They showed the whole veterinary establishment, and it does honour to the Government of France. It was formed in 1766; in 1783 a farm was annexed to it, and four other professorships established—two for rural economy, one for anatomy, and another for chemistry. I was informed that Mons. d'Aubenton (the naturalist), who is at the head of this farm, with a salary of 6,000 livres a year, reads lectures on rural economy, particularly on sheep, and that a flock was for that purpose kept in exhibition. There is a spacious and convenient apartment for dissecting horses and other animals, a large cabinet where the most interesting parts of all domestic animals are preserved in spirits, and also such parts of their bodies that mark the visible effects of distempers. This is very rich. This, with a similar school near Lyons, is kept up (exclusive of the addition of 1783) at the moderate expense, as appears by the writings of M. Necker, of about 60,000 livres (£2,600), where, as in many other instances, it appears that the most useful things cost the least. There are at present about one hundred *eleves* from different parts of the kingdom, as well as from every country in Europe except England—a strange exception, considering how grossly ignorant our farriers are, and that the whole expense of supporting a young man here does not exceed forty louis a year, nor more than four years necessary for his complete instruction. As to the farm, it is under the conduct of a great naturalist, high in royal academies of science, and whose name is celebrated through Europe for merit in superior branches of knowledge."

TUBERCULOSIS IN BOMBAY, INDIA.

At the first general meeting of the Bombay Veterinary Association, held on August 13th, 1889, Dr. Nariman showed two specimens of tuberculous lung from a working bullock—one in the first stage of consolidation passing here and there into the second stage, and the other in the third stage with large vomicæ; and made the following remarks about Tuberculosis as noticed in Bombay:—

(*a*) As a rule, in Tuberculosis of the lungs there is no marked cough, nor are any severe respiratory symptoms noticed, so that if auscultation is not made, the cases remain obscure during life.

(*b*) Although Tuberculosis among cattle is very common in Bombay, the

lung form (Phthisis Pulmonalis) is rare even among cows; the forms most common are Tuberculous Arthritis and Tabes Mesenterica.

(*c*) That tubercles generally affect in the ox the parts of the lungs towards the heart, whereas in men the superior portions, those away from the heart, are almost invariably affected.

It was suggested that gravity might have something to do with the position of the tubercles.

Dr. Nariman also remarked that he remembers having seen in Bombay only one case before of Phthisis, and it was in a milch cow which presented well marked symptoms during life.

TUBERCULOSIS IN THE UNITED STATES.

TUBERCULOSIS has lately been receiving nearly as much attention in the United States of America as in Europe, and the following resolutions were recently carried at a meeting of the Veterinary Medical Association of that country:—

Whereas, We, the members of the United States Veterinary Medical Association, being sensible of the prevalence of bovine Tuberculosis in the United States, particularly in the dairy stock of the eastern States, it being computed that at least from 10 to 15 per cent. are so affected in one form or another; being satisfied of its infectious and contagious character, and of its identity with Tuberculosis, or Consumption, in the human family; that it can be conveyed to others both by inoculation and ingestion; and believing that a large percentage of this disease in mankind can be traced to this source;

Resolved, That we strongly condemn the use of the milk or flesh of animals so affected in any form, as an article of diet.

2. *Resolved*, That this Association urgently protests against the employment of empirics as meat or dairy inspectors; that such duties should be confined to duly qualified veterinarians having a comprehensive knowledge of comparative pathology.

3. *Resolved*, That the inspection of meat can only be properly conducted at the abbattoirs.

4. *Resolved*, That all dairies should be periodically visited, the cows carefully examined, and their condition reported upon to the local authorities.

5. *Resolved*, That a committee of three be appointed by the chair to place these resolutions before the Secretary of Agriculture, so that national measures may be adopted by which this disease can be placed under the same category as Contagious Pleuro-pneumonia, and to be similarly dealt with.

GOITRE IN THE HORSE.—THYROIDECTOMY.

IT has been known for some years that extirpation of the thyroid gland or "body" in dogs is frequently followed by death, and a like result has often been witnessed in mankind, Myxœdema generally supervening. In these cases death is supposed to be due to veritable poisoning by substances entering the blood, which, under ordinary circumstances, are destroyed or transformed by this ductless gland. But it does not appear that its excision affects the horse. In the *Journal de Médecine Vetérinaire et de Zootechnie* for 1886, Massot described two successful cases of Thyroidectomy, one on a horse, the other on a foal. Quite recently, Neyraud operated upon an old horse which had an unilateral Goitre that seriously hindered respiration

and deglutition, as well as the circulation of the blood in the neck. He removed the hypertrophied gland without any difficulty, and his patient rapidly recovered without exhibiting any symptoms which might lead to the supposition that this organ, the physiological functions of which are not yet defined, was of any importance in the equine species.

HEREDITARY UNSOUNDNESS IN HORSES.

THE Royal Commission on Horse-breeding, acting upon the expert evidence laid before them recently (a large number of witnesses having been examined), have intimated that, for the future, the following diseases shall disqualify a thoroughbred stallion for the purposes of the Commission: Roaring, Whistling, Ringbone, Unsound feet, Navicular disease, Spavin, Cataract.

Another important point is that, in the event of a thoroughbred stallion being disqualified by the veterinary inspectors, any exhibitor of such stallion may ascertain, on application to the Secretary, the cause for such disqualification. Further, it is stated that the attention of the judges will be directed to "conformation," especially in reference to hocks, feet, etc.

APPLICATION OF THE MICROBICIDE PROPERTIES OF CORROSIVE SUBLIMATE TO THE TREATMENT OF PLANTAR FISTULA (QUITTOR).

IN the *Revue Vétérinaire*, Professor Mauri, of the Toulouse Veterinary School, discusses the treatment of "Quittor" by means of bichloride of mercury. He remarks, what is known to those veterinary surgeons who practise in towns, that necrosis is a very frequent complication of all the injuries to the complementary cartilages of the pedal bone of the horse. It is also due to inflammation extending to them from the neighbouring tissues; and in order to explain the facility with which Necrosis occurs in these cartilages in the majority of cases, their low vitality has been invoked. This cause certainly exists, but there is another much more efficacious, and that is the presence of pus, the contact of which is irritating, and the microbes and septic germs held in suspension in that fluid, which is otherwise an excellent culture medium for them.

In order to allow the cartilage tissue to become restored, it is therefore above all things necessary to preserve it from the irritating action of the pus, by opposing to the latter an unsurmountable barrier; or in modifying that fluid in such a way that it will become inoffensive to the tissues with which it comes in contact. The most certain way of effecting this object is furnished by the antiseptic method of treatment. Continuous irrigation with cold water, which has yielded good results in the treatment of Pedal Fistula, acts rather in rendering the wound aseptic than by its antiphlogistic effects. There is an agent endowed with very energetic microbicide properties, which answers well in preventing suppuration, or at least in reducing it as much as possible—this is corrosive sublimate. Employed in washes on wounds and in injections for fistulæ, it favourably modifies both, and brings about a cure in a short time.

Mauri has utilised the microbicide properties of this therapeutic agent in the treatment of necrosis of the complementary (lateral) cartilages of the pedal bone of the horse. It is well known how difficult it is to arrest this necrosis when it has shown itself in this part,—only too frequently escharotic injections are impotent to dispel it,—the French operation of extirpation of

the cartilage is serious, painful, and a long time is required for recovery. The antiseptic treatment is, on the contrary, rapid in curing, nearly always efficacious, and comparatively inexpensive.

In proof of this, Mauri gives two instances of a typical kind, observed in draught horses, the fistulæ being due to serious suppurating corns. The treatment employed consisted in thinning the horn of the sole and wall, in the excision of the shred of necrosed cartilage, and in consecutive dressing of the wounds with Van Swieten's fluid.* In the two cases, recovery was rapid and exempt from complication. The treatment with corrosive sublimate, 1 in 1,000, by rendering the surgical wounds aseptic, in a few days arrested the necrosis and quickly brought about cicatrisation of the tissues.

Although there are here only two clinical facts, the demonstration is evident, and no doubt the antiseptic treatment of "quittor" will continue to give practitioners as favourable results as it afforded to Mauri. It is added that corrosive sublimate employed as washes, and also added to dressings, will produce almost unhoped-for results in serious cases of "picked-up nail" (*clou de rue penetrant*), after partial or total excision of the plantar aponeurosis.

TRANSMISSION OF ACTINOMYCOSIS.

In Vienna a case of transmission of Actinomycosis of the tongue in man, and which is interesting on account of the manner of infection, has been reported. The patient was a medical practitioner and veterinary surgeon, as is not unfrequently the case in Austria, and, as veterinary inspector at a town in Poland, he had to superintend the importation of cattle from Russia. As he had to sometimes examine many papers relating to the consignment of these animals, he was in the habit of moistening his fingers on his tongue in order the more easily to turn over the numerous sheets presented to him by the cattle-drivers. After indulging in this habit for some months, he observed a swelling of his tongue, which he at first feared was cancer; but taking also into consideration the fact that several cases of Actinomycosis had been observed among the cattle examined by him, he believed in the possibility of an infection by the disease. Microscopical examination of the pus discharged revealed the presence of the actinomyces. The abscess was scraped out, and the patient soon recovered.

Reviews.

Materia Medica Veterinaria Indica. By J. H. Steel and T. J. Symonds, F.L.S. (Madras: Printed at the Lawrence Asylum Press. 1889.)

This work, the joint production of two well-known officers of the Army Veterinary Department, deals with the principal drugs employed in animal medicine in India, and will, doubtless, be found of much service and interest to practitioners in that country; and even to the veterinary surgeon in other parts of the world it will not be devoid of value, if only to show him how extensively his science ranges, and the great number of remedial agents which are to be found beyond his own particular list.

* Solution of corrosive sublimate.

The letterpress, by Mr. Steel, is very instructive, and his introduction gives us a very interesting sketch of Indian medication among the native practitioners, or "Salootries," who have not only their special drugs, but curious and novel notions as to their preparation and administration to the different animals which come under their care. The plates, which are coloured, represent the medicinal plants described, and are skilfully drawn by Mr. Symonds. As a contribution to English veterinary literature, the work deserves hearty recognition, and is an evidence of the ability and enthusiasm which the officers of the Army Veterinary Department bring to their vocation in a country which is not very favourable for scientific investigation or literary effort.

OUR CATS, AND ALL ABOUT THEM. By HARRISON WEIR, F.R.H.S. (Tunbridge Wells: R. Clements and Co. 1889.)

Harrison Weir is best known as an admirable delineator of animals, his pencil having been employed in illustrating their forms, beauties, peculiarities, and habits, for very many years. In this way he has been not only a prominent promoter of the study of natural history, and, indeed, of general education, but he has also largely aided the cause of humanity to animals, as he has in other ways proved a sincere friend to them. As president of the National Cat Club, and an ardent admirer of the only domesticated member of the feline tribe, he has given us a book on Pussy which is, we believe, altogether unique. No other work on the subject at all approaches it; for it is even more original, and is certainly far more instructive and entertaining, than Champfleury's book, "Les Chats."

Mr. Weir has the honour of being the promoter of the first Cat Show at the Crystal Palace. He says, in his introductory chapter, "It is many years ago that, when thinking of the large number of cats kept in London alone, I conceived the idea that it would be well to hold cat shows, so that the different breeds, colours, markings, etc., might be more carefully attended to, and the domestic cat, sitting in front of the fire, would then possess a beauty and an attractiveness to its owner unobserved and unknown, because uncultivated, heretofore." And acting with his well-known energy and application, an exhibition of cats soon took place, and many have been held since then.

The book is eminently descriptive and anecdotical. There are sections on the habits of cats; trained cats; long-haired cats; all the different varieties of cats (and they are startlingly numerous to the uninitiated); the various colours of cats; their usefulness; general management of them; breeding them (and especially for colour) and rearing them; the points by which they are judged (as specified by the author); their diseases and medical treatment; the wild cat of Britain; cat lore and proverbs; performing cats; and everything else pertaining to the tribe. As was to be expected, the illustrations, and they are very numerous, form one of the most characteristic features of the book, and it might be asserted that Mr. Weir has seldom done better work, or been more at home in a subject, than he shows himself to be here.

Veterinary surgeons are often called in to lend their aid to these

household pets, and they therefore should know something of everything that Harrison Weir treats of in his delightful little book, which is a veritable tribute of affection and esteem for "one of the most intelligent of (though often much abused) animals."

THE VETERINARY SURGEON'S DIARY AND NOTE-BOOK FOR 1890. THE AGRICULTURIST'S POCKET-BOOK AND DIARY FOR 1890. (London: Baillière, Tindall, and Cox.)

These two annuals are the production of Mr. E. E. Bennett, Army Veterinary Department, and must prove most useful to those for whom they have been specially prepared. Indeed, the first on the list has already had a year's test, the 1889 issue having proved a marked success, inasmuch as it met a long-felt requirement. The issue for the present year is sure to be found as handy and valuable.

The second, that for agriculturists, should meet with equal success, as it embodies a great amount of information in a small and readily accessible form, while the diary will serve an every-day purpose. Farmers and others who have to do with land, labourers, and farm animals, will feel grateful to Mr. Bennett for supplying them with an *aide* they never before possessed, and will be enabled to get through more business with its assistance than they could do without it. Author and publishers are to be congratulated on their enterprise in providing veterinary surgeons and farmers with such complete and portable books of reference and memoranda.

THE DOG-OWNER'S ANNUAL FOR 1890. (London: Dean and Son.)

This is a wonderful shillings' worth of information about dogs. It contains excellent papers on a great variety of canine subjects, by well-known writers. Among these we may indicate ably-written articles on Muzzling, *pro* and *con*, by E. Millais and Dr. Stables; "A Dog of Flanders," by Krehl; "The Esquimaux Dog," by Taunton; "The Law Concerning Dogs," by Payne; papers on dog diseases and their treatment, by Moore, Sewell, and Rotheram; as well as information concerning kennel clubs, foxhounds, kennel management, and many other details. There is also a number of good and appropriate illustrations. Altogether there is a regular mine of dog lore contained within the covers of this annual, which ought to be in the possession of every owner of a dog and every one who has to do with that animal.

Proceedings of Veterinary Medical Societies, &c.

SOUTH DURHAM AND NORTH YORKSHIRE VETERINARY MEDICAL ASSOCIATION.

A MEETING of this Association was held in the North Eastern Hotel, Darlington, on Friday, December 13th, 1889, Jno. Nettelton, Esq., President, in the chair. There were also present Messrs. Peele, West Hartlepool; Pickering,

York ; Nash, Richmond ; Stevens, Briggs, Gelsthorpe, and Axe, Darlington ; Peele, Durham ; Nicholson, West Auckland ; and Awde, Stockton-on-Tees. An interesting case of fractured humerus was brought forward by Mr. Pickering.

The committee appointed submitted the rules they had drawn up, which, with some slight alterations, were adopted and ordered to be printed.

The discussion of the President's address was carried on by all the members present, after which the President replied.

Mr. Pickering then introduced the subject of "Pupilage and Practice" for discussion, but it was decided to hold it over for another meeting.

CENTRAL VETERINARY MEDICAL SOCIETY.

An Ordinary General Meeting of the Central Veterinary Medical Society was held at the First Avenue Hotel, on Nov. 7th, when there were present thirty Fellows and visitors. A large number of letters were received from Fellows and friends expressive of regret at being unable to attend, many of them wishing the new President every success during his term of office.

Professor Shave, of the Royal Veterinary College, and Mr. T. Hibbard, M.R.C.V.S., of Epping, were unanimously elected Fellows of the Society, after which Mr. William Hunting addressed the meeting as follows :

Gentlemen,—I beg to thank you for electing me to the Presidentship of the Society, and to assure you that I recognise not only the honour of the position but its duties. I intend to try during my term of office to maintain the Society at, at least, the same high standard that it has attained under former Presidents. I am fully aware that this can only be achieved by the willing co-operation of its members. I have devoted some consideration to the subject upon which I ought to address you to-night, and I can think of none better than how we may all best assist in carrying out the objects for which the Society was founded. We have a greater number of meetings in each year than any other Veterinary Medical Society, and therefore possess greater opportunities, and necessarily greater responsibilities in regard to the use we make of them.

At our meetings are exhibited pathological specimens, and we read and discuss papers, but I venture to think we rather neglect one simple plan, which would be most interesting and instructive—the relation of cases seen in practice. Busy men, as most of us are, we often find little time for the production of written papers. We all see cases of interest—cases in which, it may be, some symptom or symptoms present themselves with a new significance, or in which the value of some special treatment is well demonstrated. We must also notice cases in which the etiology of the malady is more clearly established, or in which the value of some special treatment is well demonstrated. We must also notice cases in which the cause, diagnosis, and treatment are all unsatisfactory. By relating our successes to a gathering of fellow-practitioners, we supply valuable experience. By relating our failures we may possibly obtain it. Where a pathological specimen can be exhibited, we, of course, obtain a statement of the case, but I suggest that there are many cases where, from various causes, no specimen can be shown, yet a relation of its salient features will repay the attention of our meetings.

Whether we exhibit a specimen, relate a case, or read a paper, we want discussion. Nothing pleases a man better than that a subject he introduces should be noticed ; more pleasant is active opposition than silent indifference. With a free exchange of ideas and experience, the truth is more certainly obtained ; and if we are not quite convinced at the time we probably

will carry away with us some suggestion which will not long lie latent, but which will be called into activity again by the first case in practice we see analogous to the one we have discussed. Neither modesty nor vanity should be permitted to close our mouths when we are able to say anything to prove or disprove the correctness of other men's observations.

Some good men contribute very little to the discussions, and yet are most desirable members. We cannot do without an audience; we must have listeners, and good listeners are the necessary complement to good speakers. To the silent member I would say, "Come to every meeting, you are a most essential part of the Society."

Some very remarkable reasons are occasionally offered for not joining in our discussions. The most common one is "I am no speaker." Now I have often formed one of those groups that collect when the meeting is ended, and have over and over again noticed those "no speakers" are quite capable of verbal criticism on the paper, and that very often they are able to relate some case having a most important bearing on the subject. They relate their case clearly, and point the application of it neatly and well. This kind of oratory, clear, brief, and to the point, is always well received, at least, wherever I have met with it. One cannot help regretting that these men do not raise the small amount of courage necessary to give the whole Society the benefit of their experience. It is a good old English rule to "give and take," and what we assemble for is to relate our experience and hear that of others. By exchange of observations we increase and correct our experience.

It should not be lost sight of that our proceedings are published, and thus our work affects a wider circle than our own Society. Progress in veterinary science is chiefly made by experts who work at one subject; but it is a fallacy to suppose that only scientific workers and those who pursue research in laboratories add to our science and art. We leave our teaching schools on obtaining a diploma, and commence practice. Only then are we compelled to observe for ourselves and work upon those observations, and if we have learned aright, nearly every case will exhibit something worth noting—something worth comparing with the next analogous case.

If we only see what we have personally been shown and accept the conclusions that have already been drawn for us, it is certain we shall make little progress, and it is almost certain that our clinical observation will soon become superficial, if not erroneous. The power to observe correctly is not an elementary gift of nature possessed by everyone, it is a rare quality, and must be cultivated. It is an acquisition requiring, in the first place, natural gifts of more than the average order, and then constant practice to develop them. It has been well said that "age is not the measure of experience;" a few facts well observed, are of more value than a lifetime of thoughtless repetition.

Our discussions afford a means of testing the correctness of our observations; that is simply invaluable if properly conducted. Mere assertion of disagreement never does much good; what we want is clear statement of fact, reasons for the opinion formed, and some respect for the views of others. Want of courtesy is not one of our vices; excess of modesty is. Very few veterinarians seem to me to accept criticism as an absolute necessity for arriving at the truth. We do not meet often enough; we remain too much tied down to our daily practice, where our dictum is accepted without question, and the result is far too much certainty that WE KNOW. We resent criticism much in the spirit of the burlesque rhyme,

> "Flat contradiction can you bear
> When you're right and know you air."

We forget how circumstances so alter things as to cause two truthful observers to describe analogous cases in somewhat different terms, and then each wonders how the other could possibly be so mistaken. None of us see all sorts of cases, under all sorts of conditions, and therefore only by the collective experience of numbers can we guard against error.

Mere observation of the phenomena of disease is, however, not of itself sufficient. Empirical experience is not a bad guide in the majority of cases, especially when the observer has been started on his way with some scientific outline. A practised ear, eye, and hand, with common sense, will make a good practitioner; but when we add to these qualifications a knowledge of the principles of our calling and sufficient appreciation of the allied sciences, especially physiology, we have the materials to make a far better one.

The best practitioner is he who combines theory and practice in proper relations. Theories and hypotheses of disease have undoubtedly led men far from the truth, and hence, in the practice of medicine, it has been and is now too often the case, that practical or empirical observation has been preferred to the experience gained by theory and practice.

In my experience the unlearned man has ever been the worst theorist. We cannot draw any conclusions from observed facts without forming a theory. Theory rightly used is a necessary element, not only to the advancement, but in the practical application of all human knowledge. Only twenty-five years ago, think what curious notions were held about the contagious diseases of animals? All our practical men had formed their opinion, and all were wrong. Those who held nearest to the views now accepted were denounced as theorists; and yet hardly any facts were then outside our observation which are now, by common consent, allowed to establish a principle.

The evil, I take it, is in the extremes. Theory and practice must be proportionate. The man who allows himself to be deluded into accepting every new hypothesis, or who permits his vanity to mislead his judgment by suggesting that he should always be able to explain every phenomenon, will never deserve to be called practical.

We must accept much in ignorance, and wait for the explanation.

On the other hand, the man who sneers at theory usually becomes an automaton, and substitutes dogma and tact for knowledge. Progress he cannot make, nor can be contribute anything to the general store of science, which he leaves just as he found it.

The Profession has a right to expect from all its members some addition to its store of knowledge, some fruits of their observation.

We obtain our right to practise by virtue of the diploma. We gain our knowledge from the collected theories and observations of those who preceded us. We are valued by the public for what we know and what we do, and this value would soon be low indeed if we made no progress. Each generation must surpass the last, and it does so in exact proportions to the progress made, to the increase of knowledge, collected and made available. To this every man should add something; if he does not, he has simply lived for himself, and fills a place among mankind analogous to that of the drones in a beehive.

Gentlemen, I must ask you to pardon the sermon. I know it is imperfect and far from original. Accept it, please, in the spirit in which it was written, simply in the hope that it might inspire some of us to more correct observation, so that we may, in the frequent exchanges of experiences which I anticipate during my year of office, have less error to eliminate and more real experience to accept. To do your duty by our Central Society you must, however, not stop at observation, you must report. If only *once* in two years

each member were to do his duty, *i.e.*, read a paper, exhibit a specimen, or narrate an interesting case, we should have the grandest meetings of any Veterinary Medical Society in the kingdom, and we should all be wiser and better.

This concluded the business of the meeting, which was followed by the Annual Dinner of the Society.

An ordinary General Meeting of the above Society was held on December 5th, at the First Avenue Hotel, Holborn. Mr. William Hunting, the President of the Society, occupied the chair, and there were present: Messrs. Bishop, Broad, Buston, A. P. Case, Caton, Elworthy, Farrow, Gostling, Hibbard, Hurndall, Irving, Lowe, T. Moore, Mulvey, Reddish, Rickards, Rogers, Rogerson, Roots, Rowe, Slocock, F. W. Stanley, Wragg, and the Hon. Secretary. Letters and telegrams were read from Professor Walley, Messrs. Roalfe Cox, Darling (of Weybridge), Hy. Edgar, J. F. Simpson, and Wright, apologising for non-attendance.

Mr. Henry Gray (West Ham) was nominated for Fellowship of the Society.

The SECRETARY announced the receipt of a pamphlet from Mr. Frank S. Billings, Nebraska, U.S.A.

Mr. ELWORTHY brought under the notice of the meeting two pedal bones, one of which showed extensive disease, the result of the horse's foot being run over by a truck, and the other was completely divided from before, backwards, the fracture being the result of the horse "picking up" a French nail.

Mr. ARTHUR ROGERSON then read the following paper on

INJURIES TO THE FOOT.

Mr. PRESIDENT AND GENTLEMEN,—To every veterinary surgeon, the injuries and diseases occurring to the foot of the horse are important and interesting; but to those who combine a forge with their practice, they possess more than a scientific importance, a forge being undoubtedly a great source of worry and anxiety to the practitioner, and, at times, attended with troubles and litigation.

It must be acknowledged that most of the injuries to the foot are attributable, either directly or indirectly, to the forge, and therefore *may* be due to negligence.

It should be our endeavour to avoid these cases, and a correct understanding of their origin and cause is a long step on the way to their prevention.

I propose, then, first to consider those injuries occurring in the forge, and to begin with what is commonly termed a

Burnt Sole.—This condition is brought about by applying the shoe too hot whilst fitting it to the foot, and the part of the foot most liable to this particular kind of injury I have found to be around the sole at the toe. This may no doubt be attributed to the extra amount of pressure brought to bear on the shoe at the time of fitting, and to the greater amount of susceptibility—this part of the foot being usually thinner than any of the rest, and when this condition is noticeable, it is a good plan to apply a little stopping over the thin place before fitting.

Another cause which I think worthy of mention in passing, is that it is by no means uncommon for the smith, whilst in the act of fitting, to rest the toe of the shoe on the end of the rasp, thus causing an additional amount of pressure at this part of the foot.

The lameness resulting from this kind of injury quickly follows, and it is not unfrequently of a very acute kind, the next morning, probably, the horse will scarcely be able to bear his foot in contact with the ground.

On removal of the shoe, and with a little careful manipulation, the seat of the injury will soon be detected. On cutting away the superficial layers of the sole, the appearance presented is of an unmistakable and pronounced character; the burnt horn-fibres are usually accompanied with an exudation of a sero-sanguineous nature, and most acute pain is evinced on the slightest pressure to the part.

If the injury is not of so serious an extent as to involve the more deep-seated structures of the foot, the case will, as a rule, be quickly amenable to the ordinary treatment, and with a few days' rest and the application of a leather sole and a side-clipped shoe, the horse will generally be sound and fit for work again.

I have a distinct recollection of one fatal case accruing from a burnt sole.

The next, and I think it may be said the most frequent kind of injury which we have to encounter, is that ordinarily denominated

Pricking.—Pricks or punctures to the horse's foot during the time of his being shod, are the results of nails being driven either carelessly or otherwise, so far as to damage the sensitive structures within the horny appendage.

Pricking may be classified into two kinds. *Firstly*, where the nail is actually driven so far as not only to penetrate the sensitive structures, but even in occasional instances the bone itself. When the latter is the case, I have no hesitation in saying that it is entirely due to gross ignorance or want of skill on the part of the shoeing-smith; and the result is a mutilation which is in nine cases out of ten attended with fatal consequences. *Secondly*, that which may or may not be ascribed to any fault of the smith; for instance, where the nail is driven so close as to cause bulging of the inner layer of the horn (frequently the result of what is termed "Buckling of the nail"), and consequently pressure is brought to bear upon the sensitive interior, leading to inflammation, with or without suppuration and lameness. To this description, according to the farriers' phraseology, the term "nail bound" is generally applied.

The various causes which may enhance the possibility of pricking are badly-fitting shoes, coarseness of the nail-holes in the shoe, causing the nail to pitch and take too deep a hold of the foot, badly-pointed nails; as a result, we may get splitting of the point, and consequent misdirection of the nail in its course. Another and by no means infrequent cause is in not removing the old "stubbs" from the foot, previous to driving the nails.

Whilst on the subject of "Nails,"—since the machine-made and ready-pointed nail has been so largely substituted for the old-fashioned hand-made one—I think it is a question worthy of our consideration, which of the many kinds of machine manufactured is the best to use? So far as my experience goes, I give preference to the "Star Nail," not only as regards its make and shape, but also its practical utility.

Injuries of this nature may arise also from a deficiency of horn in any part of the foot, either traumatic or natural. When this is the case, it is better for the smith not to attempt the insertion of a nail, rather than run the risk of laming the horse. As to natural conformation, I have found that those generally termed "mule-footed" are more susceptible to this kind of injury than any other.

It is not necessarily the case that when the seat of the injury is determined upon the damage done is to be attributed to the nail in the immediate vicinity. This point must be decided upon at the time of examination, which I need hardly remind you should be done carefully and with some amount of skill. In my opinion, where practicable the presence of the veterinary surgeon

should always be enforced, or he may frequently be misguided, and almost perplexed, in arriving at a correct decision by the smith, in order to screen himself, wilfully mutilating the foot in such a way as to render it a matter of impossibility for either the veterinary surgeon or any one else to arrive at any definite opinion as to the actual cause of lameness. The lameness arising from a prick in shoeing generally manifests itself shortly after the horse has been shod, say from two to four days; but it is by no means uncommon for the horse not to drop lame for even two or three weeks afterwards. In the latter case, I may say that during my experience it is, as a rule, not due to the nail in the foot at the time, but to what is usually termed a "drawn nail;" and the period that has elapsed between the time of shoeing and the manifestation of the lameness may be explained by the inflammatory action resulting, in consequence of the damage done being more tardy in its progress than if it were subject to the continued irritation of a nail left in the foot. I have not found it to be the case, as described by some veterinarians, that when the puncture or prick is at the toe of the foot the suppurative action is much quicker, and makes its way to the coronet more readily than when any other part of the foot is affected. We have nothing to guide us in saying that there is any dissimilarity in the texture of the horn in any particular part, therefore I fail to comprehend upon what ground this theory can be based. Bearing in mind the internal relations of the foot, and the intimate connection subsisting between the sensitive and non-sensitive structures, it may be a matter for surprise, and even congratulation, that injuries of this nature are not of more frequent occurrence. As pricks in shoeing do, and will, at times happen to the most expert hands, we ought not to attribute every case to ignorance or blundering. The success to be achieved in the treatment of these cases depends entirely upon the timely relief of the encased matter, and when this is given promptly and skilfully, I may say that, generally speaking, no other kind of foot injury is more easily dealt with; but on reversion of this order, I think I am equally right in saying that no other kind of injury to the foot is attended with more disastrous results; hence the unquestionable advisability of the presence of the Vet., whose decision in the case should always be final, impartial, and unprejudiced.

Having completed a summary of the injuries which are directly connected with the forge, we now pass on to those which owe their origin to other sources, coupled, of course, with the mode of shoeing to a greater or less degree; and the first I will mention is

Corns.—The name of corn is unquestionably a term borrowed from human surgery, probably because, like corns affecting the foot of the superior animal, they are found to originate from a bruise or from continued pressure; but if the comparison be carried further than this, misconception will undoubtedly result; for corns affecting the foot of the horse *must* pathologically be regarded as quite a different disease to that appertaining to the foot of man. The structures involved in the two morbid processes are not, of course, histologically, to be compared.

Corns affecting the animal with which we have to deal, are undoubtedly a *great cause* of lameness, particularly amongst the heavier class of horses which are submitted to the constant jar of our London stones. To describe the cause of this malady it would in a great measure be correct to attribute it to faulty shoeing, for as I am not aware of any horse ever being the subject of this affection, previous to his being submitted to the hands of the shoeing smith, and as lameness does not follow for several days after being shod, I think it is feasible to assert the primary offending cause to be the shoe.

The seat of corn is well-known to all of you. I should describe it as being situated in the triangular space between the bars and quarters at the heel of

the foot. A corn may consist only of a mere contusion, or bruise to the villous tissue of the sensitive sole, producing blood extravasation which permeates the pores of the horn, and causes the discoloration so noticeable on removing the superficial layers of the sole. This condition only constitutes the *primary* stage of the foot disease, and if this is accompanied with lameness, and immediate attention is called, the treatment usually adopted is simple and in a general way very effective. But when this is neglected, and the primary stage prolonged by allowing the offending cause to remain, the inflammatory action goes on, and the pathological changes that take place result in a collection of *purulent* matter in the part, in which case it is denominated a *suppurating or festered corn.*

This condition is generally accompanied by most acute lameness, and the treatment necessary is usually of a more difficult character; and perhaps I shall find from more experienced members present, that it affords room for a divergence of practice. Cases have come under my observation in which, when the corn *has* been in the suppurative stage, the lameness manifested has only been slight; and these are the kind of cases which not unfrequently prove so troublesome to the veterinarian, as the pus not being allowed to escape below, works its way for an outlet at the coronet, and then we have to encounter one of the most refractory of all foot diseases, viz., a Sinuous Abscess or Quittor.

According to the teachings of Gamgee and others, corns were described as "horny tumours." This description would not coincide with our teaching at the present day, for during the period that I have been connected with a large stud of horses—and I might say that I rarely fail to make an examination of each case of lameness that happens—I have only come across two cases that merit this appellation. On each occasion these tumours were completely embedded in the sole, and on carefully cutting around them they appeared quite detached, and were easily removed; in size they resembled a small hazel nut, but were somewhat pointed at both ends; on transverse section they presented an outer covering of horn, the interior being filled with a kind of caseous material, and to the best of my recollection I found them in the *hind* feet, exactly at the seat of corn. The predominant situation of corns will be found to be in the *front* feet, and the inner angle of the foot is more frequently affected than the outer. Cases of corn in the hind feet are of somewhat rare occurrence.

Admitting that the shoe is usually the offending body, either by careless fitting or by allowing it to remain on the foot too long, it is also possible for a stone or gravel to become lodged between the shoe and the sole and produce the same result.

A shoe being improperly shaped or carelessly put on might produce a corn, by preventing a necessary amount of yielding of the sole under the weight or force applied upon it during action.

The fact of the fore feet being almost exclusively subject to this kind of injury, is partly to be accounted for in the London van-horse; because having to do a considerable amount of fast trotting, it is absolutely necessary that the fore shoes be kept *short* and closely *fitted* at the heels. The fore feet, too, have to support a much greater weight, which in action is thrown directly upon them; and this, with the fact that the inner angle of the foot is always weaker than the outer, is a sufficient explanation for the prevailing locality of corns.

Other causes in the production of corns are bad conformation of feet. I have noticed that those with flat full soles, and low weak heels, are most susceptible.

I attribute the rarity of corns in the hind feet in a great measure to the extra length the shoes can be fitted at the heels; in fact, their occurrence in

the hind feet, in cases that have come under my observation, have, generally speaking, been the result of shoeing with a *feather-edged shoe.*

Before completing these comparatively superficial remarks upon so important an injury, I should like to submit for your observation and discussion the fact, that it is by no means uncommon to find a corn accompanied by a sidebone. To my mind this seems rather difficult to account for, unless we fortify ourselves with the hypothesis that those conditions and conformations of feet which are predisposed to the one, are equally so to the other.

Sandcrack.—This term, as applied to a disease of the foot, would naturally be understood by the uninitiated to mean a *crack* caused by or containing *sand.* This of course, sound rather ridiculous when we consider the nature of the affection as applied to the foot of the horse, and remember that it is, practically speaking, confined to those horses which have to encounter the stone-paving in our large towns. Percivall suggests that the word *sundered* substituted for *sand* would be more comprehensible, and to all intents and purposes a better definition, and in this we may agree. Sand is a comparatively scarce material, certainly much needed in some parts of our London streets.

A sandcrack, using the ordinary acceptation of the term, may be described as a longitudinal division to a greater or less extent, of the horn fibres of the wall of the hoof, as a rule commencing at the coronet, and extending downwards either in a straight or zig-zag fashion. It may be found in any part of either fore or hind feet, but more commonly is it noticeable at the front part of the *hind,* and the sides or quarters of the *front* feet. It is usual for a "quarter crack" to assume a more slanting direction than one occurring at the front of the foot, owing to the horn fibres taking a more oblique course. The crack may consist of a simple cleft of the horn fibres, involving the sensitive structure only at the juncture of the horn with the skin, or it may assume a much more serious aspect, and the separation extend so deep as to implicate the sensitive laminæ, in which case the inflammation resulting generally terminates in the suppurative process, and if this is not shortly relieved from below, the pent-up matter will naturally work its way to the coronet, and produce such an amount of tumefaction as to result in a total separation of the horn from the coronary secreting substance. As a sequel, we often get malformation of the foot in this particular part, resulting in a permanent eye-sore, if nothing more serious.

With regard to this particular disease, I have not been able to trace any record of its ever occurring to the foot previous to its being submitted to the shoeing-smith; and, as before remarked, it is unusual for the feet to become attacked until they have been subjected to the wear and tear of our hard roads; more especially do I allude to the varying kinds of material at present used in paving the streets in our large towns.

So far as the smith is concerned in the production of sandcrack, it may be occasioned by his fixing the shoe on without getting it well embedded, and so causing an inordinate amount of pressure in any part of the foot: or again, by not sufficiently cutting away the toe of the foot—thus exposing it to the strain of improper angles. These, together with the concussion, the pace, and the big loads which horses are frequently called upon to draw, are, I think, sufficient to justify my having classified "sandcrack" as being either directly or indirectly attributable to injuries. It is well known that horn is incapable of active disease, being a secreted and not a formative material; hence the cause must be an *extrinsic* one.

The wet and dirty condition of the streets is also an important factor in their production. Especially do I allude to this circumstance, because after a horse has so far recovered from lameness attending the original crack as to

be fit for work, so sure will the dirt and moisture work its way in and so re-open the fissure, and make the horse as lame as ever for a few days.

Amongst natural causes, the insufficiency of horn secretion in any part of the foot would have a great tendency to result in a sandcrack. Horses with upright, blocky feet I have found more predisposed to Toe-sandcrack; and those formations which I have previously noticed as more liable to corns, are, in my opinion, also susceptible to Quarter-sandcrack. It is by no means an uncommon coincidence for a sandcrack to supervene upon a severe tread or other injury to the coronet, and when arising from this cause, I have found them the most difficult of any to deal with. Another description we frequently encounter as a cause of lameness, and what I have chosen to designate as

Sandcrack of the Sole.—This I think I am justified in saying has never been expounded by any of our writers on foot lameness; it certainly cannot be said to be anything new, and possibly might have been classified by authors under the heading of "Bruises to the Sole." But when we come to notice the characteristic features in connection with this, as compared with a mere bruise, a marked deviation can be observed: for instance, it is invariably found around the the sole that comes in contact with the shoes, consequently so far as the shoe is concerned in producing the other kind of sandcrack, so it must be admitted that the shoe is equally productive of the kind at present under consideration. On a careful examination of the foot, after the removal of the shoe, in order to discover the exact part of the foot where our search for the cause of lameness is to take place, nothing will be noticeable except the flinching of the horse when the sole is tapped with the hammer or squeezed with the pincers; but on removing the sole with the drawing-knife, a distinct black mark will be found, which will reveal, upon close observation, nothing more or less than a split in the sole, analogous in every particular to the crack common to the wall. A minute search of this must be made, until the pent-up matter, which I might say is invariably present, is allowed to escape; in colour the pus resembles, and is almost identical with, that found to accompany a prick in shoeing; consequently, considering that these cracks or splits are always found in the immediate vicinity of the nail holes, a certain amount of discretionary skill is required in order that the lameness may be attributed to its proper cause. This is one more instance in which the presence of the veterinary surgeon is imperative, in order to prevent undue blame being attached to the shoeing-smith. Misconception in these cases might very easily arise, where parties concerned are disposed to accept an unskilled opinion—sometimes resulting in danger to the proprietor of the forge not only of losing a shoeing contract, but also of being involved in other ways which would probably prove even more disastrous.

Treading on the Clip.—This is also a frequent cause of serious and prolonged lameness, and may arise either from the shoe being actually thrown, and the horse's foot coming in contact with it; or, as is more generally the case, the shoe becomes loose from the breakage of some of the nails or otherwise, and allows sufficient space for the clip to become imbedded in the foot, and so lame the animal. The wound, on searching it with the knife, will be found to present a dark appearance, and to correspond with the size of the clip; and when it is the result of the shoe becoming loose *only*, it will be noticeable at the juncture of the sole with the crust. If the injury is caused by a thrown shoe, *any* part of either the frog or the sole may be the subject of the injury. It is not unusual for a portion of the clip to break off in the foot, so when an examination of the shoe that caused the injury is impossible, a thorough search of the wound should be made with a view of detecting any broken pieces that might be in the foot.

Should the pedal-bone become injured, and this is by no means an un-

common occurrence, the case must be looked upon as serious, and some weeks will elapse, even under the most favourable circumstances, for the exfoliation of the piece of injured bone to take place.

On carefully recording these cases of injury, it will perhaps appear rather astounding to you that damage of this description to the pedal bone is much oftener attended with more successful results than when this bone is the recipient of an injury from any other source. This is, to a certain extent, proved by the rarity of a specimen of this kind of injury.

Malformation of the coronet is not an unfrequent subsequent effect. This is likely to arise when the suppurative action attending takes an upward tendency in spite of every attention, and relieves itself by the formation of an abscess, which, after the healing process has subsided, leaves such an amount of thickening as to depreciate the animal's value, if not also its future usefulness.

Picking up Nails.—This is, in my opinion, of even more importance than any of the others, and is of much more frequent occurrence than one would imagine. The horses which comprise the studs of our large railway companies, carriers, and contractors, working in and about the city, the docks, and the numerous depôts, where packing cases form a large proportion of consignments, are especially liable. From the different kinds of specimens I have laid before you, which are not only various but somewhat curious, you will see that the streets have contributed not only nails, but such articles as bolts, screws, flint stones, and pieces of broken bottles which the horses' feet gather during their travels. This kind of injury is one of the greatest pests which we, as London veterinarians, have to contend with. It not only entails a large amount of suffering to the animal that is unfortunate enough to have its foot so damaged; but the actual loss annually accruing to our large horse-owners is so enormous, that it is next to impossible to estimate, and, forsooth, it is not in our power to prescribe a remedy.

The specimens, which are very numerous, have all been taken from horses' feet within so short a period as the last six months—a fact some of you will no doubt consider almost incredible. The predominant description, you will observe, is what is known as the ordinary *French nail*, such other miscellaneous articles as bolts, various pieces of broken iron, flint stones and glass, mutton-chop bones, ordinary toilet pins—and in one instance within my recollection, the prongs of a dinner fork—are more uncommonly met with, but are equally productive of serious lameness. The extent of the lameness resulting naturally depends upon the part of the foot penetrated and the extent of the penetration. The only parts of the foot subjected to these injuries are the sole and the frog, but the latter, on account of its exposed situation and softer texture, is more susceptible than the sole. The usual spot for gathering these foreign materials, and especially *nails*, I have found to be within about an inch of the point of the frog, and generally in the commissure existing between the sole and frog. All the feet are unquestionably liable to injury by these agents, but on carefully recording such cases it will be noticeable that the hind feet oftener suffer than the front; and this, in my opinion, may be satisfactorily accounted for by the *slipping* of the hind feet during the time the horse is in the act of backing his load to the required position in the different goods depots or warehouse yards.

The success attending the treatment of these cases depends in a great measure upon the length of time the nail or other object has been in the foot, previous to being detected. Cases have come under my notice where tetanic symptoms have developed themselves before any attention whatever has been paid to the foot; the nail only causing slight lameness, and the careless stableman no doubt thinking it would pass off if the horse was allowed a day or two's rest. The seriousness of the case depends, of course, upon the

extent of the injury to the sensitive structure of either the sole or the frog. Concerning punctures to the latter, I have known a nail even to penetrate so deep as to actually damage the navicular bursa, but these cases fortunately are of rare occurrence. As regards punctures of the sole, these, as above stated, are much less frequent, but when found it is not uncommon for the pedal bone to become involved in the damage done. When such vital and important structures as the bone and the bursa are implicated, such cases must be looked upon as of long duration, and are, as a rule, very obstinate and tedious to deal with.

The lameness resulting from the presence of a picked-up nail is often peculiarly indicated—the horse suddenly snatching up the foot after its coming in contact with the ground. A leather sole is not always a certain preventive or safeguard against the foot being injured in this particular way, as I have come across two cases within the last six or eight years where the nail actually passed through the leather and punctured the frog to a considerable depth.

Having now completed the very brief, and I am afraid rather uninteresting, description of the most common injuries that happen to the foot of the horse, I think my endeavours to absorb your interest would be even more incomplete if I closed this paper without commenting a little upon the

Treatment.—I do not anticipate that I shall elicit anything out of the common in the details of my treatment, but an interchange of ideas upon any practical or scientific subject often tends to enlightenment, and encourages us to adopt other remedial measures than those to which we have so long been accustomed. It should be our utmost endeavour not solely to maintain our professional reputation, but to strive for the alleviation of suffering to which the animals under our care may be subjected, and at the same time to study the by no means unimportant factor—the interests of our client.

The treatment necessary for all foot cases is based upon the following settled rules of action, viz. :—Remove the cause : Relieve the pressure : Give exit to matter : and—most essential of them all—Expedition.

It is not usual for the veterinary surgeon to undertake the active part of removing the shoe and cutting out the foot, but it is nevertheless indispensable that he should be capable of performing this act if occasion require him to do so ; therefore a good "smith," either in his employ or otherwise, should be at hand to carry out this duty. It is absolutely necessary that the tools requisite should be kept in workmanlike condition ; blunt knives not only tend to excite the operator's temper, but prevent him carrying out his search quickly and skilfully. Three or four sharp foot-searchers, varying in size, will be all that is wanted, so far as instruments are concerned. Of course, the paring away of horn depends upon the amount of relief required, but my experience has taught me that the more conservative we are in this respect the better.

The treatment necessary for a "Corn" is, generally speaking, simple, and in the majority of cases of short duration and very effectual. It is, I think, an acknowledged fact that the corn must be well cut out, with the view of ascertaining whether or not pus exists there ; if not, and the lameness is only slight, I have adopted the plan of not applying a poultice at all, but simply removing the exciting cause by having the shoe cut in the manner shown in specimen, and at once put on with a leather sole, when, in nine cases out of ten, the lameness will disappear after twenty-four hours' rest, and the horse is fit for work again.

But when the corn is in a state of suppuration, it will be found necessary to poultice it for about two days ; after that allow the foot to remain bare on a peat-moss bed for a similar period, and in the meantime dress it with the

ordinary white lotion, which I have found to be more efficacious than any other kind of foot-dressing. Then apply the shoe and leather as represented, when you may expect, in the majority of instances, to have your horse fit to resume work again.

The treatment for the next foot injury, viz.,

Sandcrack, is, as I shall possibly find from your criticism, of a more questionable character; but I can only relate what I have found, after many trials, to be the most reliable and successful. I repeat that, as with corns, it is unmistakably necessary that the crack should be thoroughly cut out. The kinds we have to encounter are very often in a festered condition, and if a means of escape is not quickly found for the matter it will, with the assistance of poulticing, soon find an exit for itself in an undesirable situation.

I have often consulted practitioners from provincial towns, and they say that it rarely happens with them that such an amount of cutting and paring is necessary. To this I can only add the remark, that the cases we meet with in London are more serious than those found in other towns; this is perhaps not difficult of explanation, at least amongst that class of animal which is more especially the subject of my paper, viz., vanners.

A certain amount of restriction should be put upon poulticing sandcracks, two or three days, in my opinion, being quite long enough; then, after allowing the foot to get hard, put on a leather sole and a shoe with side clips, as represented in specimen; further rest and an occasional blister to the coronet will materially facilitate the growing down of the horn, which is, I believe, supposed to grow at the rate of about a quarter of an inch a month. When this has taken place, and the horse can withstand the jar of the stones, I have a nail inserted transversely to the crack and clenched in the ordinary way. The cutting away of the toe, as defined in the specimen, has also a useful tendency in assisting the object of the nail, *i.e.*, in keeping the crack together.

The treatment essential for the other kind of injuries I have quoted—treading on the clip, picking up nails, etc., needs very little further comment. The application of poultices to the feet so injured, I advise should be of as short a duration as possible. Of course, when our case does not respond in the way we generally expect it to do, we may then conclude that we have to deal with damage to the bone. These are fortunately somewhat rare cases, and no rule can be laid down.

In conclusion, I should like to make just a few remarks upon a particular kind of shoe that is very frequently adopted in cases of foot lameness, and imagined by some to be unequalled in supporting and guarding the foot, and this is the

Bar-shoe.—It is a shoe that has been handed down from generation to generation, and upon this simple fact alone, I am inclined to think, rests the only reason for its almost universal adoption, without any consideration whatever whether an ordinary plain shoe, upon being properly adjusted, should not be equally effectual. So far as I am concerned, I have not used a bar-shoe for the last five years, having been able to so manipulate an ordinary plain shoe that, in conjunction with a leather sole, it should, I think, always suffice for any kind of foot. A bar-shoe is not only unsightly but unnecessary, in my opinion; for the frog, if protected by a leather sole, is quite capable of sustaining itself against all wear and concussion without hampering it with a bar of iron, which only labels the foot and attracts the attention of all outsiders. Of course it will no doubt be said that bar-shoes are absolutely indispensable for some conditions of feet; but, so far as my experience goes, I am inclined to make the somewhat appalling assertion that, when such is the case, the horse is more valuable to the "knacker" than to his "unfortunate owner."

At its conclusion, Mr. ELWORTHY said he thought pricks in shoeing were, to a great extent, due to the employment of inferior men; in his own establishment, in which some of the farriers had been at work for twenty-five or thirty years, they rarely pricked a horse, and he was certain that with responsible and experienced farriers this kind of thing would not often occur. In his experience, Corn was rare in the hind feet; as to Sandcrack, he did not see the necessity for opening the foot to the great extent advocated by the essayist, for he found that with rest and a blister to the coronet, the lameness usually disappeared. He was certain that horses derived great benefit from the use of the bar-shoe, and it was as good a thing as could be devised for keeping "old crocks" going.

Mr. ALFRED BROAD had no doubt that "side-bones" predisposed to Corn. He had known many instances in which the appearance of an abscess at the heel was the first indication of the presence of a Corn, the horse having previously shown no lameness. In Sandcrack he had not found it beneficial to open the crack by cutting away the horn, and had known intense pain and death arise from this proceeding. But he agreed that if poulticing did not afford relief, the best course was to blister the coronet.

Mr. CATON had known portions of the pedal-bone exfoliate, and the horse recover. He bore testimony to the great loss of life and services from horses picking up nails and such articles, and advocated the use of a plated shoe, *i.e.*, a removable piece of thin iron instead of leather soles; for he found leathers for this purpose of very little good, being so often perforated by pointed objects. He was a great believer in soaking and poulticing injured feet, and also in the bar-shoe, which, although it might be old-fashioned, he liked very much. With reference to Corns, he thought there were very few horses with "side-bones" that were not the subject of Corns, and he also thought that Corns were more often caused by Sidebones than otherwise.

Mr. ROOTS found that where six pricks in shoeing used to occur, he now only got one; this, in his opinion, was due to the great improvement in the quality of nails; he now used only machine-made nails, and he preferred the brands known as "The Lion" or "The Star." In the treatment of Corns, he advocated the use of a three-quarter bar-shoe. He had never seen a Sandcrack of the sole, but he remembered the case of a horse with a fissure at the point of the toe, which occasionally gave rise to lameness as long as the animal lived.

Mr. HUNTING said that only that very day he had heard a fact illustrative of the importance of horse-shoeing. A certain firm, by economy in their farriers' wages, and in horse-shoeing generally, saved some £1,200 a year, and thought that they had done great things; but Quittor and all forms of foot-lameness increased, and a little calculation showed them that, instead of saving £1,200 per annum, they had lost something like £3,000 worth of horses since their altered style of shoeing was started.

It was true that machine-made nails had been of great benefit; this was not the case, however, with machine-made shoes; they were nearly all unevenly holed, so that the farrier could not properly direct his nail. He was at a loss to understand why engineers, who were now so skilful, could not turn out horse-shoes with evenly-made nail holes. Mr. Rogerson had alluded to the practice of workmen trying to screen themselves in cases of pricking; some men were extremely hasty with farriers, and thought for a horse to be pricked was an unpardonable sin. But he had generally found such men knew nothing about horse-shoeing; he held a man should not be blamed unless his carelessness was proved, and a man who, having pricked a horse, went and told his employer, ought to be excused. Pricking was a question which often cropped up in law-courts, and it was a debatable point as to how long a horse might go after being "bound" or "pricked" without

showing lameness. He knew that a horse having been bound in one or two nails, might not show any lameness for ten days after he had been shod. He agreed that the "Star" and the "Lion" nails were excellent, but there was another brand, the "H. P.," which, as an Englishman, he should like to say, was the best. He had noticed that the speakers who had told them that "Sidebones" accompanied Corns were gentlemen whose practice lay with heavy horses. Personally he knew little about heavy horses, but in other classes he had not found this to be the case; it was possible to produce a corn by leaving the foot uneven. As a pupil of Gamgee, he repudiated that that gentleman had ever taught that corns were horn tumours. He (Mr. Hunting) believed that Corns were produced by shoeing only; neither did he believe in the old adage, "Once a Corn always a Corn," although it was pretty nearly true if the Corn had been in existence any length of time. He questioned whether they ought not, as a society, to take some practical notice of the question of "Picking up Nails." When they came to consider that, in one firm alone, during the last six months, 200 French nails had been found in the feet of horses, it pointed to the necessity for some steps being taken to keep the streets clear of such articles, for it showed great negligence on the part of those who pulled packing cases to pieces. In the treatment of foot cases Mr. Rogerson had rightly pointed out that expedition was greatly to be desired, and by that he meant the early detection and the early treatment of the injury.

He, the speaker, believed that poulticing in foot cases was generally much overdone; a great deal of mischief arose from pursuing this treatment after the "matter" had escaped. Mr. Rogerson had made a very sweeping assertion on the question of bar-shoes; but if he had men clever enough to fit ordinary shoes on all diseased feet, he was quite right in making his assertion. Bar-shoes might not be handsome, but what did that matter if they were useful? In the north of England "the Patten Shoe" was much used in those cases of lameness where the horse, when at rest, elevated the heel of his foot from the ground; this was equivalent to raising the ground up to his heel, which was just the position the horse was doing his best to avoid. He thought in the paring of feet the more conservative they were the better; he knew men of great experience in foot cases who cut and mutilated the feet a good deal—surely this was not good surgery; one could nearly always judge as to the presence of pus in the foot without paring out every nail-hole. As to sandcrack, he differed from the essayist's opinion that it should be cut out, if suppuration and great lameness had not occurred. Why cut it out? If they did so, they must also adopt Mr. South's plan—put something in the part again to prevent the clips of the shoe drawing the foot together and pinching the internal structures, a block of wood should be put into the cavity, so as to prevent any movement of the hoof.

Mr. WRAGG having expressed his regret that he, being unavoidably late, had only heard the concluding portion of the paper, said that it was more often the fireman than the doorman who was to blame for horses being pricked. As a rule, when a horse was pricked, the nail-hole of the shoe was defective. Although, personally, he always found fault with the doorman for trying to drive a nail with such a shoe. As to machine-made nails, there was no doubt they were much thinner than hand-made ones, and, in addition, they were polished and free from rust, which was, undoubtedly, beneficial. In the treatment of Sandcrack, he always adopted Mr. South's method, and with very good results. He cut out the Sandcrack, whether there was pus or not; but if there was pus he would not put in the wooden plug for the whole extent of the crack, but would temporarily insert a short plug at the lower end of the fissure, and then poultice and otherwise treat until all suppuration had ceased, when he would have a plug inserted the whole extent of the

crack; this plan of treatment was very efficacious. It was not, in his experience, that horses with Side-bones invariably had Corns, and he thought there was very little connection between the two diseases. In the treatment of suppurating Corns he used a three-quarter shoe, but in some cases, as also in other diseases of the foot, he was a believer in the utility of bar-shoes. The old theory quoted by Mr. Hunting, "Once a Corn always a Corn," had long since been exploded.

Mr. STANLEY had great faith in poultices for injuries to the feet; Corns were not in every case the result of shoeing or concussion on hard roads, for he once knew an unshod colt suffering from Corn.

After a few remarks from Mr. VILLAR, in which he complimented the essayist on the very practical way in which he had dealt with his subject,

Mr. SLOCOCK said although he had never seen "corns" in an unshod colt, he had seen "sandcrack," and he thought that some animals had naturally a weak kind of horn which was predisposed to troubles. In the treatment of foot cases, he believed in the use of poultices until the horn was thoroughly soft.

Mr. ROWE had for many years used the "Patten Shoe"—it might perhaps be called "the Lever Shoe"; the bar of the patten, instead of having a straight ground surface, was convex from heel to heel—this shoe was especially useful in "wricked" fetlocks. As to the length of time which may elapse before a horse showed symptoms of lameness after pricking, he found that if a horse was tightly bound with the nails not many hours would pass before it gave rise to lameness. Usually lameness occurred within three days after a prick, but of course at times it did not supervene for eight or nine days. They could not get away from the fact that a case of pricking might occur in any one's forge at any moment; one had to entirely rely on workmen, and the present underselling in the shoeing business was a mistake and conducive to pricking.

The PRESIDENT remarking on the lateness of the hour, called on the essayist to reply, and Mr. ROGERSON, after thanking the gentlemen for so readily entering into the discussion of the subject which he had introduced, proceeded in an able manner to answer the points which had been raised by the various speakers.

On the motion of the PRESIDENT, seconded by Mr. CATON, a hearty vote of thanks was unanimously accorded the essayist.

It was announced that at the next meeting Mr. Caton would in a short paper introduce the subject of "Influenza." S. VILLAR, *Hon. Sec.*

THE WESTERN COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE half-yearly meeting of the above Association was held at the New London Hotel, Exeter, on the 7th of November.

The President, H. Thomas, occupied the chair. There were also present: Messrs. S. Burton, Torquay; J. P. Heath, Exeter (vice-presidents); C. H. Golledge, Sherborne; H. P. Chase, Tiverton; W. Roach, Exeter; A. J. Down, Sampford Peverell; W. H. Bloye, Plymouth; J. Harvey, St. Columb; and W. Penhale, hon. sec., Barnstaple. Letters and telegrams regretting inability to attend the meeting were received from Professor Penberthy, Messrs. J. Olver, J. H. Penhale, C. W. Timms, W. Ascott, C. Parsons, J. Oliver, J. Endle, and A. J. Stewart.

The minutes of the last meeting were read and confirmed. Messrs. Timms and Nelder were elected new members of the Association.

It was resolved that the instruments, the property of the Association, shall

be kept at Mr. Fomacus, cutler, Exeter, who will receive and deliver them as required, and keep them in order.

Mr. CHASE exhibited some interesting specimens of diseased bones, and related two cases which had come under his notice of fractured humeri occurring whilst the horses were hunting, doubtless due to the powerful contraction of the muscles of the shoulder.

Mr. GOLLEDGE related the case of a cat which had an abdominal tumour weighing as much as 2 lbs. 2 oz.

Mr. HARVEY said he had found iodized phenol very successful in the treatment of malignant catarrh; he injected 1 part to 40 of water into the nostrils every few hours.

The PRESIDENT then called on Mr. Harvey to read his paper on

SOME OF THE BLOOD DISEASES OF SHEEP.

I was somewhat surprised a short time since on receiving a note from your Secretary, asking me if I could introduce some subject for discussion at the next half-yearly meeting of this Society.

Thinking he might get some older member to contribute a paper, I told him he could hold me in reserve, and in the meantime thought of some subject on which to write. Considering the great value of our ovine population, and the ravages which disease annually makes amongst its members, I could think of no more fitting subject than that class of blood disease commonly considered anthracoid, and spoken of in different parts as "Anthrax," "Braxy," "Felon," "Inflammation," "Strike of Blood," and other terms quite too numerous to mention.

Agriculturists usually exhibit far too much apathy in seeking remedies, or more properly speaking, advice in dealing with disease amongst their sheep, often losing fifty or a hundred pounds' worth before they make any attempt to stay the disease. Much of this is due to their considering a sheep doomed as soon as disease takes hold of him, the fact being that the great variety of common cases amongst horses and cattle which form so important a part of the daily work of a country practitioner are but seldom met with in sheep. Though when they do occur, and are properly treated, I see no reason to suppose a higher fatality than in our other patients.

From a comparative point of view the reverse should be the case, seeing that of all the animals of the farm the sheep is the one that still most approaches the simple life.

The catarrhs and inflammations incidental to confinement in a vitiated atmosphere, with the attendant typhoid state, are not met with often. To the comparative therapeutist, therefore, ovine medicine would likely yield useful lessons. While, however, this open life of the sheep renders him less liable to the diseases incidental to domestication, he is nevertheless the victim of influences often equally disastrous in their results. Thus parasitic invasions, bad management, and dietetic errors obtain. While accessory to the latter cause may be mentioned the cleft upper lip, which enabling the animal to graze low, may favour the entrance of sand or gravel into the stomach, as I frequently saw in 1887 when examining sheep dead of Braxy. In that autumn I visited several farms where the sheep had been half starved in the summer months, with a result of severe losses later in the year.

In addition to the cleft upper lip, which especially obtain in sheep, the fleece is probably not without its influence in determining many cases of disease, both of a local and general nature. Thus it has long been recognised that tempestuous nights are often attended with a high mortality in flocks in which Braxy has shown itself. The animals are here probably chilled with the clogging of the saturated fleece, and fall victims to congestive disorders.

It seems probable, then, that invasions of the tissues by micro-parasites, errors of diet and mismanagement, atmospheric conditions and anatomical peculiarities may all be operative at times in inducing those congestive disorders above alluded to, and which are probably more frequent in sheep than in other domesticated animals.

I shall not weary you by giving a long list of symptoms and *post-mortem* appearances of Braxy or Anthrax, as they are quite familiar to you all, but shall content myself with a few remarks on the natural history and the preventitive medicinal treatment of the conditions of the above nature, as met with in a district in which sheep-raising is not an unimportant interest. It occurs to me that soil may exert considerable influence on blood diseases by modifying the particular bacillus, the character of the disease germs undergoing marked alterations. In a similar manner breed may be sufficient to effect a change in the life of the germs. The Algerian sheep are refractory to the Anthrax poisons. While the difference between Splenic Apoplexy and Braxy may be more apparent than real, the difference being due to local causes. For it must be remembered that the bacteriologist is not the only agent able to alternate or increase the action of a virus.

The class of blood diseases spoken of usually under the generic term "Braxy" may embrace many conditions, and one variety, the so-called "Red Braxy," with which we shall more particularly deal, probably includes two distinct diseases, viz., Anthrax, and another condition far more common, at least in this country, and probably of a septicæmic nature. The former disease, Splenic Apoplexy, is not commonly met with in this country, though on the Continent the disease is of frequent occurrence. Of the numerous outbreaks of disease among sheep which I have seen in my district, I have not as yet been satisfied that either one has been due to this form of Anthrax.

Numerous outbreaks of Anthrax, however, have been traced to careless disposal of dead sheep, and Professor Robertson has mentioned in his book on "Equine Medicine" some instances in which sheep were the first animals attacked, the disease subsequently occurring among the horses.

And the same author, in discussing the possibility of the Anthrax poisons becoming attenuated in a locality after a time, alludes to it as having gradually given place to another form of Anthrax, most frequently the erysipelatous, and that where Anthrax Fever existed in cattle, this succeeding Anthrax, Erysipelas appeared in sheep. An instance of this kind was mentioned in the *Veterinary Record* for September by Mr. Merrick. Some pasture land on which Anthrax had frequently occurred was changed into arable land. But sheep had since been dying from what was considered to be Anthrax. Professor Penberthy, however, found no bacilli in the blood, and was of opinion that the disease was Braxy, whatever that might mean. In this case the microscopic appearance was very similar to Anthrax. A similar case to the above came under my notice some years since. I was almost certain the disease from which the sheep were dying was Anthrax, but I found the blood was perfectly innoxious on rabbits. Anthrax, when occurring in sheep, is practically the same in its course and termination as in other animals.

It will therefore be out of place, in a paper of this kind, to consider it *in extenso*. Pasteur, in his experiments on sheep with Charbon-impregnated food, found that they did not all succumb; with one or more feeds, often in flocks of from three to six, the mortality was nil. But when deaths did occur it was always from Charbon, and had an incubative period of four, five, six, seven, or ten days, although by its latest symptoms it most frequently seemed rapidly destructive. According to Toussaint, "In eleven out of twelve sheep the lesions resulting from the action and presence of the Anthrax bacillus were observed in the glands which receive the lymphatics of the

tongue and pharynx, and consecutively in the prepectoral and prescapular glands." He thus affirms that in eleven out of twelve cases the spores or bacilli penetrated by the mouth and pharynx. In the twelfth sheep lesions were found only in the right propliteal gland, which implied in this case entry of bacilli by the right hind limb. Success, however, did not attend examinations for the exact point of inoculation. Toussaint further found that puncture of the frænum linguæ sufficed to produce a point for inoculation. In summing up these experiments Pasteur says, "That Charbon germs are distributed everywhere more or less, but especially where the disease is enzootic. Natural infection takes place by means of food covered with bacteria, but only when wounds exist along the alimentary tract, such wounds being insignificant as regards the general health, but important in regard to the causations of Anthrax."

A drought involves the liability to wounds, by increasing the amount of mineral diet ingested and the hardness of certain portions of food consumed. This was especially noticeable in 1887, a year noted in my district for the heavy losses from Braxy. And the mineral matter present in the stomachs of sheep dying in that year has already been alluded to. According to Toussaint, sheep and rabbits are somewhat differently affected by bacteria compared with the horse, ass, and dog. What he calls the inflammation-producing tendency of bacterids is stronger in the latter animals than the former. Thus he says, "In the rabbit and sheep, since the inflammatory action of bacteria is but little marked after death, the bacteria are found only in the blood vessels and in those glands alone which are situated on the course of the lymph vessels coming from the point of inoculation."

This tendency of the sheep to congestive states, rather than the inflammatory, seems to have been admitted clinically in this country. I can see no other reason for so many different causes, predisposing and exciting, inducing results in a given organism having so much in common with another. Thus Professor Walley, in a practical paper on the diseases of sheep, read before one of the northern Veterinary Medical Societies, says:—"Animals forced with injudicious quantities of highly carbonaceous and nitrogenous food not unfrequently become overladen with fat or flesh-forming elements. Assimilation and transformation are imperfectly performed, important organs become congested, and fail in the due performance of their functions. Adverse influences are brought to bear on such symptoms, with the result that death is quickly produced by congestion or inflammation of the lungs or some other vascular organs. Inflammations, on the other hand, food containing excess of saline matter or phosphates, and at the same time surcharged with moisture, is allowed *ad libitum*, with the result that the blood and vessels are acted upon in the same way as in the experimental introduction of such substances into the circulation, viz., effusions and blood extravasations. It is equally true that deficiency of these agents leads to various and important dyscrasias —excess in one direction, deficiency in the other, producing identical results."

Sheep dying under all these conditions present appearances very much in common, the chief characteristics of Braxy being that the animals die in a short space of time, and that after death the tissues, or organs, or both, are the seat of violent congestion or of blood extravasations, giving them a red colour and an inflamed appearance.

Mr. Gamgee described Braxy as a distinct disease from Anthrax, and was careful to point out that, as occurring in the Highlands, Braxy was not contagious, since for ages sheep dying of the disease had been dressed as Braxy mutton. Continuing his remarks, however, on this question, he says:—"I am not aware of any experiments having been performed as to the inoculation of the disease, but as causes favouring the development of the disease are prevalent in the winter months, this may be a sufficient reason for the absence

of any virus, and the safety with which the animals may be eaten by human beings."

These remarks, though written after the descriptions by Dr. Davaine of the bacillus anthracis in the blood of Anthrax patients, do not accord with our views of contagion in the present day.

Since Mr. Gamgee wrote, however, Braxy and Anthrax have been described as identical diseases, due to the presence of anthracis bacillus in the blood; and the eating of Braxy hams or mutton has been adduced as evidence that Anthrax flesh may be consumed largely with impunity.

Remarks on Braxy Mutton.

It appears to me there must be some laxity of description when it is said that sheep dying of Braxy may be consumed with impunity, for the extraordinary rapidity with which the carcase decomposes would render it almost impossible. What is probably meant is that sheep affected with the malady are knifed, well bled, and then dressed, a procedure quite compatible with the existence of Braxy. The mutton in most such cases keeps well, and is quite innocuous. In keeping quantities, it contrasts very strongly with the flesh of an animal dying of the disease. I once saw two ewes suffering from Braxy. One was killed, and the mutton kept well, and was of fair colour; the other died after an hour or two, and the carcase soon became putrid. In this respect Braxy resembles Anthrax. The poison, be it bacillus anthrax or not, is not developed to any marked extent while the animal is alive. The case here alluded to was from a flock in which many cases of Braxy had occurred, and in which the disease could not be imparted to rabbits by inoculation. I would here remark that two rabbits used in these tests died in the usual number of hours after inoculation with a drop of blood from an ox, dead of Anthrax. These results induced us to inquire into the subject of Braxy, for it appeared that the disease, which we had considered to be Charbon, did not give the usual result of inoculation.

Moreover, it appeared the disease was not prophylactic against Anthrax, as it would likely be if the outbreak was a modified form of Charbon. The latter, however, is the probable conclusion. Some of the rabbits were inoculated three or four times; in every case the animals retained their usual health. The only inoculation on a sheep performed was that of an animal in low condition from an injury some time before. A small slit in the skin was made on the back, and a drop of blood from the neck of a sheep, dead of Braxy, placed therein. He was then turned with the other sheep, and seemed to suffer no ill effects whatever. This experiment, however, is of little value more than as suggesting that the proper diathesis must be regarded as next in importance to the presence of the particular bacilla and essential cause.

The inoculations were sufficiently numerous to lead to the belief that Braxy could not be transmitted to rabbits, and therefore differed from Anthrax, while, on the other hand, in its chemical features and rough anatomical changes it closely resembled that disease.

Whatever view we may take of the nature of this disease, whether it be peculiar to sheep or common to other animals of the farm, its importance cannot be over-estimated.

Mr. Gamgee was of opinion that 150,000 sheep die annually of the disease in Scotland, and in other parts of the British Islands the losses are sometimes exceedingly heavy.

In considering the natural history of Braxy on a farm or district, it will often be found, at least in my experience, that on those areas where Splenic Apoplexy is most common among the cattle, but few cases of Braxy will occur. On the other hand, on Braxy farms, Splenic Apoplexy may be

almost unknown, while Symptomatic Anthrax or Black Leg will be seen quite often.

Professor Axe, in investigating a series of outbreaks of Anthrax at Hilkham, found that sheep could be pastured on the dangerous areas with impunity, provided they were not pastured along with or after oxen in which Anthrax existed. In the latter case the sheep were attacked with Anthrax and died. The bacillæ anthracæ were then probably present in greater numbers, and inoculation took place, after the manner described by Pasteur. This is interesting clinically, as I do not remember to have met with a case in which the contrary took place, that is, where this congestive disease (not Splenic Apoplexy) of sheep existed, for the cattle to have become affected.

Arable farms furnish, with me, by far the greater number of Braxy cases, and I would here note that the better the farm be for corn the greater the tendency is to have annual losses from Braxy. The pastures on these lands are quick to be influenced by atmospheric states. Droughts burn them up rapidly, while warm showers forward a quick growth of tender herbage. On the whole, their altitude is greater than permanent pasture, excepting the proper sheep-runs, and they are thus more exposed to storm and sudden changes of temperature. Compare them with the lands noted for their manurial richness, the warm valleys, marshes, and old pasture-land, which furnish us with Splenic Apoplexy.

Allusion was made, when giving quotations from Professor Walley's paper on the diseases of the sheep, to the tendency of a diet containing an undue proportion of saline material to induce effusions and blood extravasation in sheep or in other animals; and I have myself noted a curious combination of exposure to severe storms, along with much saline matter in the food, inducing death in sheep, with all the phenomena of Braxy. On these particular pastures, situated close to the sea, and with a southern aspect, it is not rare after a storm blowing from the north-west for sheep to die within a few days. They are usually found dead, and rapidly decompose. During these storms much saline material is deposited on the herbage from the spray blown up from the sea. The amount of salt thus thrown over the soil is sometimes very considerable, and cannot be other than prejudicial to the health of the flock. At first I was inclined to regard the cause of death as due to poisoning by sodium chloride, or similar salts of sea-water. Accident, however, caused me to modify somewhat this view, and to suggest that the sudden accession of much saline probably induced changes in the blood, resulting in congestive disorders.

In July, 1888, I was consulted regarding a disease affecting a flock of ewes, 150 in number. I was told that during the previous two months several had died from Felon or Braxy, and that on July 14th, the owner had drenched the flock with salt and water. The quantity given to each sheep could not be ascertained, but the owner was positive that on former occasions he had given a like amount with no ill effect. Note the result. During the next fifty hours the ewes ill and those dead numbered twenty-five. From the symptoms of the living—and the *post-mortem* performed suggested the existence of Braxy in the flock—it occurred to us that the salt had in some way precipitated the disease in many of the animals, just as a storm or some sudden change in the economy seems frequently to do. Some sheep in the above outbreak died sixty hours after receiving the salt, and were only an hour or two ill. Large bullæ rapidly formed on the skins after death, and in a few hours the carcases were most offensive. The blood did not coagulate, and was of a lake tint. Its plastic elements seemed deficient, as if the tissues were sodden with it. For July month, the weather was cold and wet, and in addition the sheep had had a rather limited run during the summer.

Chlorate of potash, resin, and sulphate of iron were given to the remaining

ewes daily for a week, with the best results, none having died from Braxy up to the present time.

It may not be out of place here to allude to the comparative action of potash and soda salts, as being in our experience of some importance in the management and prevention of some of these congestive disorders among sheep. As a rule, it has been found that potassium salts, notably the chlorate, exert marked influence for good, the deaths practically ceasing as soon as its administration is begun. On the other hand, soda salts (chloride) and magnesian sulphate seem to have but little effect, even if they do not sometimes increase the death-rate for the first few days. This conclusion is the result of numerous observations, and I shall await the opinion with interest of gentlemen I see around me, who can lay claim to a more extended experience of sheep diseases than myself.

There can be no doubt that Braxy is the result of invasion of the blood with micro-organisms, and we all know how small a change in the composition of that tissue determines whether a certain bacillus shall grow to multiply in it or not.

Soda salts exist largely in the fluid parts of the blood, and the proportion of sodium chloride in the body varies. During its stay in the body the salt does not appear to alter the composition of the tissues, but influences the solubility of albuminous substances, and also increases the secretion of potash salts. On the other hand, potash salts occur, chiefly in the solid corpuscular element of the blood.

It seems that the marked benefit of potassium chlorate in Braxy may be due to one or more causes, viz. :—

1. By promoting a healthy condition of the mucous membrane of the alimentary tract, notably the anterior part, where bacilli more frequently find their point of entrance, as quoted by Pasteur. Abrasions and superficial erosions in the mucous membrane, from the presence of earth, etc., in the stomach, a sound epithelial surface offering greater resistance to the invasions of bacteria, whether those of Anthrax or of Septicæmia.

2. By its alterative actions on the corpuscular and plastic elements of the blood after absorption; thus enabling the corpuscles to exert greater destructive power on foreign organisms entering the blood. For one of the modes of explaining the action of a vaccine, is that the corpuscles are made during its sojourn in the blood to destroy or resist the multiplication of a more virulent cultivation of the same organisms.

Pasteur, previously to developing his Anthrax vaccine, in order to test his theory that wounds along the alimentary tract are all-important in developing Anthrax, advised the removal of everything from the food which might injure the animals, especially in the mouth, and to dress the interior of the mouth of oxen and horses with a solution to promote cicatrisation; also to wash the eyes and nose with chlorate of potash water, and allow them to drink of it.

The treatment we have found of benefit in counteracting these blood disorders of sheep is similar to the above in principle. The detail may be varied. The plan adopted is to place about one drachm of the chlorate of potash, in powder, in the mouth of the sheep daily for a week; sometimes resin and iron are added. The powder is placed in the mouth with a small spoon and allowed to dissolve. The method is simple, expeditious, and free from danger. Each animal is sure to have received a definite quantity of the salt, as would not be the case if simply mixed with the food. Each plan can be used in turn.

According to Pasteur, Charbon germs are distributed everywhere, but especially where the disease is enzootic, and the same terms would appear applicable to Braxy as occurring in the country, and of the nature of which

there is some doubt. It has been said that where sheep were fed with Charbon-impregnated food, deaths occurred after the fourth day, and then frequently only where thistles or some sharp substance was added to the food, so as to excoriate the mucous membrane; but apparently Braxy frequently occurs in forty-eight hours under similar circumstances to the above. Thus I am acquainted with certain fields where the owners are so sure that one or more sheep will die in two or three days after stocking, that they never turn sheep on them.

In a flock of any size, it is probable that there are always some members ready to fall victims to Braxy, even in pastures where the disease is seldom seen; and it seems sufficient for such animals to be engorged with food, or exposed to sudden alterations of temperature, etc., in order to rapidly succumb. Very few farms are exempt from Braxy in this sporadic form. On the other hand, the disease may occur as an enzootic from some special cause, in an area where Braxy has been absent for some years.

In November, 1887, we were consulted about a flock of sheep in which many deaths had occurred; Anthrax was suspected. A sheep, see *ante*, and some rabbits were inoculated with negative results. In the *post-mortems* performed in these cases, as in others, the spleen was sometimes enlarged, but never engorged, as in Anthrax or Splenic Apoplexy. The history of this outbreak is interesting. Earth saturated with the drainage from carcases long dead from blood affections, distributed over the pastures, followed by numerous sudden deaths among the sheep from Braxy in all respects similar to Anthrax. Yet examination of the blood gave negative results, as also did inoculation.

It would appear that Braxy in sheep is as much a distinct disease from Splenic Apoplexy, as is Symptomatic Anthrax or Black Quarter. As an epizootic, Braxy prevailed in the latter months of 1887, succeeding the very dry summer. Long stinting of food and the entrance of sand, etc., into the stomach, and remaining there, along with a rapidly advancing plethora, were all factors contributing to the death-rate. In addition, then, advance of pregnancy must be regarded as another predisposing cause.

It is surprising how very few accidents happen from the careless disposal of Braxy carcases. They are frequently left lying about the fields, and devoured by dogs, birds, etc. The wool is pulled from the dead animal by hand, an operation regarded as a test for the cause of death by many farmers, the wool pulling with ease in most cases, as in outbreaks of Anthrax many animals are believed to pass through the disease and recover.

Mr. BURTON thought much mischief arose in sheep through overcrowding; it was ruinous to graze young sheep after adults, especially on old pastures. Rape, mustard, and new grasses were excellent for young sheep.

Mr. GOLLEDGE was of opinion that Braxy was a disease of which little was really known; that it was a specific blood disease, depending on a micro-organism for its production, but different from Anthrax, there could be no doubt. In Anthrax it was not difficult to discover the bacillus with the microscope, and the nature of the disease could also be tested by inoculation; but in Braxy and Black Quarter he had failed to detect any organism. Recently his father lost a young animal from Black Quarter; the skin was lying in a shed where there were some others, of which three died in a few days. Setoning afforded protection against Black Quarter; it was a prophylactic measure, which had stood the test of time. He conjectured that it possibly did so by setting up a low inflammatory action, which increased the number of white corpuscles in the blood.

The PRESIDENT said he always setoned for Black Quarter, and believed as long as the setons were kept running they afforded protection. When animals were gaining rapidly they were more disposed to an attack.

Mr. BURTON said his sheep practice was very limited, yet he could not but help seeing the paper which had just been read was a valuable one; he therefore moved a vote of thanks to Mr. Harvey for it.

Mr. HEATH said sheep would be much better if they were provided with more shelter during rough and inclement weather; they especially wanted dry ground to lie on. Braxy without doubt was a blood disease, and being so prevalent along our coasts, it would appear that salt somehow acted as an exciting cause, although in most diseases of this type salt was a preventive. He concluded by saying the paper they had just listened to was a most instructive one, and he begged to second the vote of thanks to Mr. Harvey for the trouble he had taken in bringing the matter so carefully before them, and he also expressed a hope that he would allow it to be printed.

Mr. HARVEY having replied, Mr. THOMAS called attention to the dirty and unsanitary condition of railway horse-boxes. The companies appeared to take no trouble whatever to cleanse or disinfect them. He believed that many infectious diseases were spread in this way.

A vote of thanks to the Chairman terminated the meeting.

The President then entertained those present to a dinner, after which the usual loyal and professional toasts were duly proposed and responded to, and an enjoyable evening spent.

W. PENHALE, *Hon. Sec.*

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

A MEETING of the above Society was held in the London Hotel, Edinburgh, on November 13th. Owing to the absence of the President, Mr. Cunningham, through indisposition, Mr. Hutton was voted to the chair, subsequently vacating it in favour of Professor Williams, one of the Vice-presidents.

There was a fair attendance, including Professors Williams and W. O. Williams, Lewis and Hunter; Messrs. Aitken, Dalkeith; Young, Mid Calder; Brown, West Calder; McDougal, Helensburgh; Philips, A.V.D., (13th Hussars); Thompson, Aspatria; Moir, Edinburgh; Professor McAlpin, Hatton, Kelso; Young, N.B.A.; the press representatives, and the Secretary.

Apologies for not being able to attend were received from a number of gentlemen.

The minutes of last meeting having been read and confirmed, the following gentlemen were elected office-bearers for the next year: President, H. Thompson, Esq., M.R.C.V.S., Aspatria; Vice-presidents, J. Hutton, Esq., F.R.C.V.S., Kelso; C. Philips, Esq., A.V.D., (13th Hussars), Edinburgh; P. Moir, Esq., M.R.C.V.S., Edinburgh; Hon. Secretary and Treasurer, R. Rutherford, F.R.C.V.S., Edinburgh.

The following gentlemen were nominated for membership: Mr. W. Hepburn, M.R.C.V.S., Coldstream; J. McDougal, M.R.C.V.S., Helensburgh; De Jong, Edinburgh.

Professor LEWIS made a statement to the effect that the balance of the funds of the late Society had been verified by him, and returned to Mr. Baird, to be forwarded to Mr. Greaves, Manchester, as a further contribution to the Benevolent Fund.

The report of the Committee appointed to draw up a petition to the Government regarding the "Sale of the Flesh and Milk of Tuberculosed Animals," was received and adopted on the motion of Professor Lewis, seconded by Mr. Aitken.

The discussion on Mr. Thompson's paper on "Difficult Parturition," already published, was then resumed, and was taken part in by Messrs. McDougal,

Hutton, Young, Brown, the Secretary, and Professor Williams, and was added to by Mr. Thompson describing some additional cases of interest.

Mr. HUTTON, Kelso, then read the following paper on "The Use and Abuse of Cake as a Feeding Stuff for Cattle and Sheep."

The feeding of cattle and sheep has become one of the most important departments connected with farming, as on its success depends the manufacture of beef and mutton. Many minute and elaborate experiments have been made from time to time by chemists, physiologists, and others, with a view of determining the principles on which its successful and economical practice may be attained.

It is not my intention to enter into any detailed account of any of those experiments, but simply to bring this subject before you as matter for discussion. I have with me a few samples of the cakes presently in use in our district. They comprise linseed cake, cotton cake, decorticated and undecorticated compound cake, and rape cake. The better to enable you to form a judgment on their respective merits, I will here give you the analysis of each.

Linseed Cake.

This cake has long been held in high repute, and is still, as a good and safe feeding cake for both cattle and sheep. There are numerous varieties in the market, of which English and American are considered the best. Oil seeds are deprived of about three-fourths of their oil by hydraulic pressure, at a temperature of about 120° Fahr., exposed to a pressure varying from 30 to 35 cwt. on the square inch. The greater part of the oil flows out and the residuum is sold as linseed cake, rape cake, etc. Good linseed cake is of a reddish-brown colour, has a uniform appearance, and is mild and pleasant in flavour. The quantity given to cattle should never exceed from 6 to 8 lbs. per day; any more than this I consider wasteful, as it passes through the system unassimilated. It should be very sparingly used at first, and increased gradually, and mixed with other feeding stuffs grown on the farm, etc. The quantities for sheep are from half-a-pound to a pound per day. The market price is from £6 15s. to £8 per ton.

The following is the analysis of what is considered by many to be the best in the market:

Moisture	12·24
Oil	10·21
Albuminous Compounds	30·87
Starch, Mucilage, and Sugar	35·98
Woody Fibre	5·26
Ash	5·44
	100·00
Nitrogen	4·94
Phosphates in Ash	2·16

Remarks of Analysts:—A pure linseed cake of high-class quality.

Cotton Cake.

Opinions differ as to the value of undecorticated cotton cake made in this country. Some stock-owners allege that it is a very dangerous food, in consequence of the large percentage of indigestible materials which it frequently contains; while others, again, assert that they have used it largely with good results. It is generally made in this country from Egyptian seed. When sold before it is thoroughly dry, it heats, and undergoes some degree of fermentation. During this process of heating it is generally supposed that the Bacillus of Anthrax, the germs of which are already in the cake brought

from Egypt—the land of Anthrax plagues—increase to an enormous extent, generation after generation becoming developed. It has been known that old undecorticated cotton cakes have given rise to Anthrax, whereas the same cake used when new had no ill effect whatever. The same, however, may be said of linseed and other cakes, particularly if the seeds are from Russia, or similarly plague-stricken countries. The decorticated cotton cakes, being generally made in America, are thoroughly dried and subjected to high-pressure, they may therefore be considered far less dangerous than home-made cakes.

Undecorticated Cotton Cake.

Moisture	11·96
Oil	72·24
Albuminous Compounds	22 62
Starch, Gum, and Sugar	28·82
Woody Fibre	23 84
Ash	5·52
	100·00
Nitrogen	3 62
Phosphates in Ash	1·92

Analyst's report: Good average quality of undecorticated cotton cake. Market value, £5 to £5 15s. per ton.

Decorticated Cotton Cake.

Moisture	9 66
Oil	12·24
Albuminous Compounds	39·12
Starch, Gum, and Sugar	26 86
Woody Fibre	5·28
Ash	6·84
	100·00
Nitrogen	6 26
Phosphates in Ash	2·48

Analyst's report: Excellent quality of decorticated cotton cake, guaranteed pure. Market value about £6 per ton.

Compound Cake.

I am very much in favour of a mixed or compound cake, thoroughly cooked—with a view of destroying disease germs of all kinds. There is a compound cake made by Messrs. A. Dunn and Sons, Kelso, that is taken well all over the Borders and is highly esteemed. It is subjected to a temperature of about 250° Fahr., with a heavy hydraulic pressure. Its analysis is as follows (value £7 5s. per ton):

Albuminous Compounds	20·12
Oil	9·96
Mucilage, Sugar, Starch, etc.	46·50
Woody Fibre	6·97
Moisture	11·20
Ash	5·25
	100·00
Nitrogen	3·22

Rape Cake.

Judged by its chemical composition, this is equal to its weight of linseed cake, but experience shows that it is decidedly inferior to the latter, owing no doubt to its acrid flavour and irritant properties. This proceeds from its being found often mixed accidentally with wild mustard or charlock seeds, which render it a somewhat unsafe food, unless used in very moderate quantities. I herewith give you an analysis of rape cake, which I will follow with my recent experiences of the use of the same.

Moisture	4·44
Oil	10·04
Albuminous Compounds	25·75
Starch, Mucilage, Sugar, etc.	36·85
Woody Fibre	5·71
Ash and Mineral Matter	12 21
	100·00
Nitrogen	4·12
Phosphates in Ash	4·16
Sand in Ash	5·36

Analyst's report: This cake contains no metallic or organic poisons, and no excess of mustard, or positive admixture with foreign seeds. The cake was, however, apparently made from imperfectly cleaned rape seed, and hence yielded a large proportion of ash, including sand. Price £6 2s. 6d. per ton.

With reference to the above analysis, I herewith subjoin a copy of certificate which I granted to a client of mine who had been using the aforesaid cake.

Kelso, *Dec.* 13*th*, 1888.

This is to certify that having to-day been requested to examine a lot of cattle belonging to a client of mine, one of them was found in a dying state by the cattle man, and other two seemingly unwell. On my arrival all the three cattle were dead. On making a *post-mortem* examination of the animals, I found them all to have died from the same cause, viz., Gastro-enteritis, or inflammation of the stomach and bowels, throughout the whole of the alimentary system. I am of opinion that the pathological changes were due to the recent introduction into the system of some pungent, and irritating, and deleterious materials in the food, which resulted in the illness and death of the cattle. On inquiring into the manner in which the animals had been fed, I found them to have been receiving for some time cotton cake, along with other materials grown on the farm. About two days previously they were put on a mixture of cotton and rape cake, 2 lb. each. The animals had only got the mixture twice when they were taken ill and died. The cause of the illness and death of the cattle points to the rape cake.

As the hour was getting late, the discussion on the paper was necessarily brief. In the course of a few remarks, Principal WILLIAMS said that rape cake was a very irritating material, and was closely allied to the wild mustard with which the rape cake was in point of fact very often mixed. When given in large quantities, even pure rape cake was very apt to cause inflammation of the stomach; and when it was adulterated with wild mustard, the result was disastrous. He had seen a whole lot of twenty bullocks taken ill with Gastro-enteritis from eating it, and of these seven or eight were dead by the time he reached them. The whole of the mucous membrane lining the stomach and intestines presented appearances similar to that induced by a

mustard plaster. In regard to the cotton cake, he said that the cotton cake made in this country was usually made from Egyptian cotton seed. When newly made it had a dampness about it, and when eaten in a fresh state it had no bad effect; but when it became old and mouldy it had a tendency to induce Anthrax. He had known cases of true Anthrax arise from the cotton cake after the animals had been taking it for many weeks. That was caused by the mould having grown upon it, and with the evolution of heat the bacilli of Anthrax developed, their germs being in the seed as it came from Egypt. After some further remarks, the discussion was postponed till next meeting.

Inoculation for Contagious Pleuro-pneumonia.

Before separating, the CHAIRMAN said there was an interesting fact in connection with the Pleuro question which had lately come under his observation as veterinary inspector for the county of Mid-Lothian. About the beginning of the year an outbreak occurred in a herd of some thirty cows, which were standing in four different byres at a short distance from each other. The cows in the byre in which the Pleuro had first appeared were slaughtered, and the cows in the other three byres were inoculated, and remained perfectly healthy. In the course of the summer a number of these inoculated cows were sold, and fresh cows introduced in their place. Some little time after, some of these newly-introduced cows developed Pleuro, and as the whole herd had by that time been mixed, they all had to be slaughtered. At the request of the local authority, as well as for his own information, the inspector, before slaughter, separated the inoculated cows from the non-inoculated animals, with the result that six of the latter were found to be tainted with Pleuro, while all the inoculated cows were perfectly free from the disease. He did not attach very much importance to this fact, but when it came on the back of so much corroborative evidence, it was at least worthy of mention.

GLASGOW VETERINARY COLLEGE.

THE Christmas examinations of the Royal College of Veterinary Surgeons were conducted within this institution on the 12th and 16th. The board of examiners included—

Sir Henry Simpson, J.P., F.R.C.V.S., Windsor; George Fleming, LL.D., C.B, etc, London; Mr. J. Roalfe Cox, F.R.C.V.S., London; Mr. Pritchard, M.R.C.V.S., London; Mr. Duguid, F.R.C.V.S., London; Mr. J. Vaughan, F.R.C.V.S., London; Mr. George A. Banham, F.R.C.V.S., Cambridge; Mr. B. Cartledge, F.R.C.V.S., Sheffield; Mr. J. Freeman, F.R.C.V.S., Dublin; Professor Hamilton, F.R.C.S.E, F.R.S.E., Aberdeen; Professor Yeo, F.R.S.C., London; Professor M'Kendrick, LL.D., F.R.S., Glasgow; Professor Almond, Cirencester College, Cirencester; Mr. W. B. Walters, F.R.C.V.S., Aldershot; Mr. T. H. Simcocks, F.R.C.V.S, Drogheda; Mr. Thomas Campbell, F.R.C.V.S., Kirkcudbright; Mr. Finlay Dun, F.R.C.V.S., Edinburgh; Professor Heaton, F.C.S., F.I.C., London; Mr. H. Oliver, F.R.C.V.S., Tamworth; Mr. W. Woods, sen., F.R.C.V.S., Wigan; and Mr. Richard Rutherford, F.R.C.V.S., Edinburgh.

There were also present as *ex officio* members—

Principal M'Call, F.R.C.V.S.; Professor Cooke, F.C.S.; Professor Limont, M.A., M.B.; and Professor Ferguson, M.R.C.V.S.

The following gentlemen passed the first (or theoretical) part of the final examination:—

Messrs. T. Gorecki, Glasgow; W. Welsh, Glasgow; H. Potts, Glasgow (G.C.); James M'Dougall, Helensburgh, Dumbartonshire; and C. J. Dunn, Glasgow.

The following gentlemen passed the second (or practical) part of the final

examination and succeeded in obtaining the diploma of the Royal College of Veterinary Surgeons:—

Messrs. H. Potts (G.C.), James M'Dougall, and C. J. Dunn.

The following students passed the "B" or second professional examination viz.—

John Meikle, Stranraer, Wigtownshire; F. J. Boyle, Ballymoney, Co. Antrim; A. Milligan, Dalbeattie, Kirkcudbrightshire (G.C.); and R. P. H. Dalglish, Govanhill, Glasgow (G.C.).

The following students passed their "A" or first professional examination, viz.—

H. M Connell, Armagh; H. L. Chambers, Ballynahinch, Co. Down; A. P. Stewart, Dennistoun, Glasgow; R. Mason, Glasgow; H. A. Hazeell, Dunoon Argyleshire; W. Crowley, Tullagower, Co. Clare; D. P. Harvey, Pollok shields, Glasgow; and F. T. Barton, Glasgow.

ROYAL AGRICULTURAL SOCIETY.

AT the monthly Council Meeting on December 11th, Sir John Thorold stated that Professor Brown had presented the following report, as well as the annual report of the Royal Veterinary College, which the Committee proposed should be published in the next number of the Journal:—

"*Pleuro-pneumonia.*—During the five weeks ended November 30th there were thirty-one fresh outbreaks of this disease in Great Britain, nineteen in England, in the counties of Cumberland, Essex, Herts, Kent, Lancaster, and Norfolk; the twelve outbreaks in Scotland occurred in the counties of Ayr, Edinburgh, Forfar, Perth, Renfrew, Peebles, and Selkirk. The two last-named counties have recently got the disease introduced by cattle bought in public saleyards.

"The number of cattle attacked in Great Britain was 123, and 448 cattle exposed to infection were also slaughtered. In Ireland seven outbreaks were reported, all in the Dublin district. Twelve cattle were attacked, and 146 healthy ones in contact were slaughtered.

"*Anthrax.*—In England twenty outbreaks of this disease were reported, thirty-four animals were attacked, six of which were killed, and twenty-eight died. In Scotland there were five outbreaks of Anthrax; six animals were attacked, all of which died. In Ireland three outbreaks occurred, in which four animals were attacked and died.

"*Swine Fever.*—During the five weeks there had been 335 fresh outbreaks of this disease in Great Britain, and 2,365 pigs attacked. This shows a marked decrease as compared with the returns for the corresponding period of last year, when these were 478 outbreaks, and 3,109 swine attacked."

A return as to the prevalence of Pleuro-pneumonia since the Slaughter Order came into operation on March 10th, 1888, had been received from the Board of Agriculture. A letter had been received from Professor Brown asking for the assistance of the Society in the endowment at the Royal Veterinary College of a chair for original investigation and research in Comparative Pathology and Bacteriology. After careful consideration of this proposal, the Committee were unanimous in recommending that, instead of the £200 annually voted to the Royal Veterinary College, an annual grant of £500 be made to the College for the purpose of establishing a Chair of Comparative Pathology and Bacteriology, subject (1) to six months' notice on the part of the Society for the discontinuance of the grant; (2) to the College undertaking, as before, to investigate any outbreaks of disease amongst animals that may be reported by members, and to defray the expenses of such investigations when considered necessary or advisable; and (3) to the existing veterinary privileges of members being continued as at present.

Army Veterinary Department.

Gazette, December 6th, 1889.

VOLUNTEER CORPS.—1st London (City of London) Artillery. The services of Veterinary Surgeon J. Elmer are dispensed with.

Gazette, December 17th.

VETERINARY DEPARTMENT.—J. Moore, gentleman, to be Veterinary Surgeon on probation, vice T. Pottinger, deceased.

Veterinary Surgeon T. Marriott has passed the higher standard in Hindustani in Bombay.

Our contemporary the *Army and Navy Gazette*, of the 14th ult., alludes to the deserved good fortune of a late member of the Army Veterinary Department, in the following terms: "Second Lieutenant Beech, C.M.G., 21st Hussars, has been promoted in the same *Gazette* to his Lieutenancy in the 4th Hussars and his troop in the 20th Hussars;" and after alluding to his war service remarks, "On the formation of the Egyptian Army he joined it in veterinary charge, but was gazetted a Second Lieutenant in the 21st Hussars, September 5th, 1888, and before Suakim last December, and more recently at Toski, he came so prominently to the front that it was felt that he was an officer in every way deserving of being pushed on in the service. It is not usual for a subaltern of fifteen months' service to find himself promoted to a troop."

It is unnecessary for us to remark that his brother officers in the Veterinary Department congratulate Captain Beech on his unparalleled and well-merited promotion.

Obituary.

WITH regret we have to announce the death of Professor J. A. McBride, M.A., Ph.D., M.R.C.V.S., which took place at Fitzroy, Melbourne, Australia, on October 29th last. He graduated in 1863, after studying under Professor Gamgee, and was for a short time a teacher at the Dick Veterinary School, Edinburgh. Soon after, he was appointed to the Chair of Veterinary Surgery at the Royal Cirencester Agricultural College, where he remained until he received the important post of Principal of the newly established Agricultural School at Yeddo, Japan. In this capacity he displayed much tact and ability, but he only held the appointment for the period of his engagement, five years, when he returned to this country and commenced practice at Cirencester. Quite recently the establishment of a Veterinary School at Melbourne, Australia, tempted him to leave home once more, and his brief career in our flourishing colony is given in the words of one who knew him intimately. "Since his arrival in the colony in February last, he has been engaged in teaching in the newly-established Veterinary College, and it is needless to say that his loss, not only as a most valuable adjunct to the teaching staff, but as a most kind-hearted friend, is, and will be, keenly felt. His quiet, unassuming demeanour and invariable kindness had endeared him alike to his fellow teachers and students, nearly all of whom followed his remains to the grave." He has died at a comparatively early age, and it is to be regretted

that he had not given us the benefit of his extensive experience in Japan, a country full of interest. That he could have done so is manifest from the only attempt he made in veterinary literature, the little work on the Anatomy of the Horse which was published at Cirencester some years ago.

W. Brown, M.R.C.V.S., died at Brondesbury, London, on December 10th, aged eighty years. He graduated in 1847. M. C. Yaxley, M.R.C.V.S., a graduate of 1876, has died at Drogheda; H. V. Lloyd, a graduate of 1879, has died at Denbigh; and H. Rangeley, of Chesterfield, a graduate of 1870, has also been reported as dead.

Jurisprudence.

WOODBRIDGE (SUFFOLK) PETTY SESSIONS.

At the Shire-hall, Woodbridge, the 11th December, 1889, before J. B. Hart, Esq. (in the chair), Hon. W. Lowther, M.P., Major-General Hessey, W. P. T. Phillips, Esq., and W. N. Waller, Esq.,

John R. Hutchinson, of Trimley, Suffolk, was charged with using the title of Veterinary Surgeon without being registered under the Act, at Trimley, on the 24th June last, and was further charged with a similar offence committed at Woodbridge, on the 3rd July last.

Mr. R. Colam (barrister), instructed by Mr. Thatcher (solicitor), appeared for the prosecution, and Mr. H. R. Moseley (solicitor) for the defence. Mr. Colam said that he was instructed to prosecute on behalf of the Council of the Royal College of Veterinary Surgeons. There were two classes of veterinary surgeons, he said, entitled to practise. The first were those who on the passing of the Act, by reason of their previous practice and experience, were admitted to practise as Registered Practitioners; and the second class were those who, by education and examination, were enrolled as members of the College. The particular circumstances connected with this case were these:—Inspector Channing, of the R.S.P.C.A., had occasion to consult the defendant, who was assistant to Mr. Phillips, of Ipswich, with reference to a donkey which he had examined. At the interview the defendant gave a certificate as to the condition of the animal, signing it "Jno. R. Hutchinson, V.S.," and positively affirming that he was a qualified practitioner. Inspector Channing, in the course of his evidence, said that the defendant positively stated that he was a Member of the College, but then withdrew this, and stated he was registered under the old Act, and afterwards positively swore in the witness-box that he was a veterinary surgeon. Inspector Channing further said that the first intimation he received of the defendant's non-qualification was a communication from the Royal College, pointing out that the defendant was not on the register. Mr. Moseley, for the defence, said that he thought the Bench would be of opinion, as he was, that his client had been guilty of the barest possible offence. The defendant, in adding the letters "V.S." to his name, had perhaps been guilty of a little vanity, but his action might be compared to that of the surgeon's assistant who, without diploma, visits and prescribes for his master's patients; or to the solicitor's clerk who, without examination or qualification, advised his employer's clients and took their fees. He asked the Bench to impose the lightest possible penalty for an offence which really was merely technical in its nature.

The Bench imposed a fine of £2 10s., court fees 11s. 3d., and counsel's fees £1 3s. 6d., in each case, making a total penalty of £8 9s. 6d.; or in default of distress, three weeks' imprisonment in each case. Mr. Moseley intimated that the money would be paid.

Notes and News.

A YANKEE DOG STORY.—The *Orillia Times* says a Waubaushene man owned a dog. The dog was a useless animal that delighted to howl and fight and bark and bite to such an extent, that the owner determined to kill him without delay. He took a clothes-line, and after the pup had been formally tried and condemned, erected a gallows and hanged him. After pulling on the string till his arm ached, he cut down the body, and the jury pronounced it a clear case of death by the terror of the law. Then, to make assurance sure, he took a club and hit the animal on the head. Then he buried it deeply, and no doubt planted pretty flowers on its grave, and retired to his virtuous couch with a clear conscience. Next morning the dog was barking at the door, wearing upon his countenance a somewhat injured look, but otherwise unhurt.

FARM STOCK IN AUSTRALASIA.—The following figures, from the *Australian Trading World*, cannot fail to be interesting to people in general and to farmers in particular; they show the total live stock returns for eight years in the Australian colonies, and while they mark the past progress, they indicate with the extension of agriculture the future probabilities :—

Stock.	1880.	1888.	Increase in 8 years.
Horses	1,230,138	1,487,938	220,800
Cattle	8,225,779	9,144,210	916,431
Sheep	75,158,683	96,563,376	21,404,693
Pigs	1,019,744	1,076,683	56,889

THE GREAT INDIAN DESERT.—Horace Bell says of this inhospitable region: "Bullocks, cows, goats, camels, and donkeys come in, untended very often, drink their fill and go away again stolidly into the desert to 'graze' on the hideous 'pasture' ground. The camel's patience under thirst is at those wells seen to be illusory. The people say goats come in to drink every day, camels and donkeys every other day, oxen every three or four days. A man's property consists of so many legs of cattle or camels. The boasted excellence of the Bikaneer or Jaysulmir riding camel is, in my experience, a delusive flight of the imagination. He is cut out by the fire horse. A camel for a raid was fed for a day on ghi as much as could be got into him, and was then left for two or three days without any food or water."

PAPER USES.—Experiments are being tried in Germany to make horse-shoes of paper; and in the United States paper twine has been used for binding corn.

DISEASE AMONG ANIMALS IN INDIA.—Anthrax among horses (fourteen deaths) has been reported from Murree, and it is said to prevail among cattle near Rawul Pindi. In Sirgooja, one of the tributary States of Chota Nagpore, last year mortality was great (12,236) from Cattle Disease, though less than in the previous year, and much less than in 1883-84. The grazing grounds are overstocked, and thus isolation cannot be thoroughly effected.

AN EQUINE CEMETERY.—One of the most unique cemeteries in the United States is that of Sheepshead Bay, Long Island, the burial-ground for noted horses. It was established two years ago, and by the end of the first year three noted racers had found a resting-place in its quiet precincts. The racer burial-ground is beautifully decorated with flowers and shrubbery, and suitable headstones mark the last resting-places of the kings and queens of the turf.

CALF MONSTROSITIES.—Recently a cow belonging to Mr. Joseph Huntington, of Morland Field, gave birth to a curiously formed calf. It has two perfect heads joined together, four eyes, and two mouths, but only two ears and one ordinary body. It can take in food with both mouths. A still more extraordinary birth is reported from Church Field, Morland, where a calf has been born turned inside out, the bowels, heart, etc., being on the outside, and what ought to be the outside skin, inside. The animal had to be removed piecemeal by Mr. John Armstrong, veterinary surgeon, Penrith.—*Cumberlana and Westmoreland Advertiser.*

SPEED OF ANIMALS.—Here are a few figures by which the comparative speed of man and some animals is shown by a German *savant*:—

A snail moves	0·0015	metres	a second
A human being	1·25	,,	,,
A fly	7·60	,,	,,
A race-horse	12·60	,,	,,
A carrier-pigeon	27·50	,,	,,
A swallow	67·00	,,	,,

KOLA SEED AS A FOOD.—MM. Heckel and Schlegden-Lauffen's researches on kola seed have led MM. Mounet and Dujardin-Beaumetz to test this substance therapeutically The tree which furnishes kola seed (*Sterculia acuminata*) is abundant on that part of the coast of Africa which is situated in the inter-tropical zone. The seed contains 2,348 per cent. of caffein, 0·028 per cent. of theobromine, 23 per cent. of starch, 2 per cent. of tannin, a red substance which is an active tonic, an essential oil possessing aphrodisiac properties; this latter must be eliminated before using the seed either as a drug or food stuff. The large quantity of caffein and theobromine contained in kola seed renders it a valuable cardiac stimulant. Kola is also valuable in treating chronic atonic dysentery such as attacks Europeans who reside or travel in hot climates; the tannin and the red substance contained in kola are the principles which render it therapeutically valuable in dysentery. M. Heckel, knowing that the negroes in the centre of Africa eat this grain when they take long journeys in barren regions, conceived the idea that it might be utilised as an article of diet for troops and the horses following the regiments. In order to realise this idea the essential oil of the seed had to be eliminated. Drying the seed resulted in the disappearance of nearly all of the oil, but there still remained a small quantity. M. Heckel succeeded in expelling this small residuum by steeping the seed during two or three days, according to the season of the year, in water, 16° to 18° C., containing 1 per cent. of carbonate of soda; then, drying and slightly roasting the seed before it became thoroughly dry. With the seed thus treated and freed from the essential oil possessing aphrodisiac properties, M. Heckel prepares chocolate powder for the use of the soldiers and an oat-cake for the horses. Both the chocolate and oat-cake have been tried by French soldiers carrying on military manœuvres in the Alps, which are of an excessively fatiguing character, requiring physical strength and powers of endurance. The army surgeons of the 7th, 23rd, and 24th Battalion of Alpine Chasseurs have reported on the rations furnished by Professor Heckel, and all have concluded that they sustain physical force, and increase the energy of the men. Nine men of the 7th Battalion who received these rations marched nineteen consecutive hours; at the twelfth hour they only showed slight symptoms of fatigue; when the march was over, they resumed their usual military duties at the fixed hours; their condition was thoroughly satisfactory, both mentally and physically. M. Sanson, Professor at the Agricultural School at Grignon, has also tested the worth of M. Heckel's

cake, made with kola seed, and has ascertained that horses like it; its nutritive properties are equal to that of twice its weight of oats; also that it exercises an action on muscular force; horses after feeding on it can endure severe fatigue without showing symptoms of exhaustion.

VETERINARY INSTRUCTION IN BRAZIL.—The Brazilian Government has decided to establish a Veterinary School under the designation of Lyceum of the Veterinary Art and Agricultural Science, and on the model of the French Veterinary Schools. It has applied to France for teachers, and the Minister of Agriculture has nominated M. Constans as the Veterinary Professor, and MM. Menien and Raimbault as Agricultural teachers.

Correspondence.

A CORRECTION.

SIR,—With reference to my article on Steatorrhœa *versus* Ringworm, in last month's Journal, would you kindly note the fact that the belief in the identity of the tricophyton and achorion was supported by Gravitz, Williams, and Macgillivray only, and *not* by Mr. Edgar? R. W. BURKE, A.V.D.

Athlone, *Dec. 11th*, 1889.

ANSWERS TO CORRESPONDENTS.

V. GRANVILLE, Nelson, New Zealand.—Probably the books that will best suit you are Steel's on the Ox and the Sheep, published by Longmans, London.

A CONSTANT READER,—See the Journal for January last. Possibly reference will be again made to the subject.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from R. W. Burke, A.V.D., Athlone; S. Villar, Harrow; W. S. Adams, Oosoor, India; A. W. Hill, London; R. Rutherford, Edinburgh; J. Milis, A.V.D., Chatham; J. Matthews, A.V.D., Royal Horse Guards; V. Granville, Nelson, New Zealand; W. T. Kendall, Melbourne, Australia; "Constant Reader;" W. Awde, Stockton-on-Tees; Professor McCall, Glasgow.

BOOKS AND PAMPHLETS: Proceedings of the Twenty-sixth Annual Meeting of the United States Veterinary Medical Association; *Sir H. E. Roscoe*, The Ventilation of Schools; Procès Verbal de l'Académie Royale de Méd. de Belgique; Journal of the Royal Society of England; Bulletin des Séances de la Société Nationale d'Agriculture de France; Bulletin et Mémoires de la Société Centrale de Médecine Vétérinaire; Live Stock Journal Almanac; *R. M. Crookshank*, History and Pathology of Vaccination; *E. E. Bennett*, Agriculturist's Pocket-book and Diary; Dog-owner's Annual; Veterinary Surgeon's Diary and Note-book.

JOURNALS, ETC.: *Wochenschrift für Thierheilkunde und Viehzucht; Journal of the National Agricultural Society of Victoria; Revue Veterinaire; London Medical Record; Recueil de Medecine Vétérinaire; Clinica Veterinaria; Journal de Méd. Veterinaire et de Zootechnie; Deutsche Zeitschrift jur Thiermedicin und Vergleichende Pathologie; Annales de Méd. Vétérinaire; Wochenschrift fur Thierheilkunde und Viehzucht; American Veterinary Review; Der Thierarzt; Echo Vétérinaire; Journal of the Society of Arts; Live Stock Journal; Lancet; Colburn's United Service Magazine; British Medical Journal; American Live Stock Journal; Edinburgh Medical Journal; Mark Lane Express; Quarterly Journal of Veterinary Science in India; Russian Veterinary Journal; Zeitschrift fur Veterinarkunde.*

NEWSPAPERS: *Rochester and Chatham Journal; Homeward Mail; Glasgow Herald.*